

CHAPTER 4.0 BURIEN'S EXISTING CONDITIONS

4.1 OVERVIEW

4.1.1 Introduction

Burien's Vision strives to secure a sustainable relationship between the people of Burien and their environment. The Vision responds to both the needs and aspirations of the community as well as the opportunities and constraints that arise out of its environment. This section of the plan describes this stage upon which the story of Burien's future will be played.

The Burien Plan addresses the needs and aspirations of those who live and work in Burien. However, in fulfilling the community's vision it is important to consider areas, resources, events, and actions outside as well as within city boundaries. Consequently, different aspects of the King County region and the more immediate Highline area are also considered in framing the implementation of the plan.

This chapter of the Burien Plan supports the need for the policy direction in Chapter Two and provides an overview of Burien's existing conditions associated with the following community parameters:

- Population
- Natural Environment
- Environmental Health
- Land Use
- Employment
- Housing
- Transportation
- Utilities
- Schools
- Parks

Information discussed in this chapter draws upon several reports and technical memos that have been prepared by City staff and its consultants. These materials, which are on file with the City, include: the *2003 Demographics Report*, supporting materials presented at Planning Commission and Steering Committee meetings and public hearings on the 2003 Comprehensive Plan update (EDAW; Mark Personius), the *2003 Transportation Study* (The Transpo Group 2003), *Downtown Economic Development Strategies* (Bucher, Willis & Ratliff Corporation; Economic Consulting Services. 1997), Southwest King County Economic Development Plan (Economics Research Associates 2000), King County Buildable Lands Report (King County 2000), *Planning Report No. 10 - Overall Land Use Patterns*, and other related technical information.

4.1.2 Burien's Character

The Economy

A particularly important influence on Burien's future is the King County economy. Since World War II, the Boeing Company has dominated the economy of King County.

Likewise, Burien's fortunes have also been coupled to the fortunes of this company. Burien received much of its growth during WW II by supplying worker housing during the company's expansion. Ever since the War, the health of Burien and the area's economy has ebbed and flowed as the company expanded or contracted. A dramatic shift occurred in Boeing in the year 2000, when the company's headquarters were relocated from the City of Seattle to Chicago. While the company's existing airplane manufacturing operations remain in the Puget Sound Region, the company has substantially reduced its workforce in the area and is considered a less stable employer than ever before. Today the city continues to provide residential neighborhoods for many workers and retirees of the company.

Other short-term economic trends have been largely negative in the central Puget Sound region since 2000, when the region's economy peaked. Declines in the aerospace and wholesale trade have slowed growth. Unemployment has increased since January 2000. Growth in personal income in the region has been flat. Due to declining tax revenue, state and local governments face serious budget problems.

Longer-term trends are much brighter. The Puget Sound region continues to show vibrant high technology growth, including aerospace, information processing, computers and biotechnology. These are the sectors that will likely be in the forefront of the U.S. economy during the first half of the 21st century. The region has a well-educated and trained workforce, and offers a high quality of life compared to other urban areas in the country. In addition, the region's history of economic growth generated by local companies such as Microsoft, Boeing, Amazon.Com and others bodes well for the future.

The Puget Sound region's economy has diversified as a result of growth in international trade and high technology. This type of growth has both positively and negatively impacted Burien. Due to the city's strategic location relative to Seattle's central business district and the port facilities on Elliot Bay, Burien has been able to provide affordable residential neighborhoods for many of these workers. Regional job growth in trade also resulted in direct and indirect employment opportunities for the area's residents. The city's proximity to the SeaTac Airport has resulted in a loss of residential neighborhood quality due to air traffic growth over the last three decades. While job growth at the airport has resulted in some economic benefits, these benefits have lagged considerably to those benefits that have accrued to the regional economy.¹

A review of King County's economy results in the following findings:

- Over the long term, regional income has gradually grown, as indicated by a measure of median household income. Median household income increased in King County from \$36,763 in 1990 to \$55,230 in 2002, by an average of 4.2% per year over a 12-year period;

¹ This conclusion is documented in the Sea-Tac International Airport Impact Mitigation Study, City of Burien, 1997.

- While growth in assessed value is very irregular, it has increased much faster than the rate of inflation over the last decade. The assessed value of land is increasing faster than the rate of growth in the value of improvements;
- The region experienced rapid economic growth during the latter 1980s; a period of stagnation in the early 1990s; strong growth in the mid and late 1990s; and an economic downturn in 2000, from which the region has been slow to fully recover;
- The cyclical effects of strong economic growth result in noticeable increases in assessed value;
- Multiple family housing starts are much more sensitive to economic cycles than single family housing starts; and
- Housing starts in the Highline area were more dominated by multiple family starts in the 1990s as compared to the rest of the county.

The following major businesses/public institutions are currently operating in the City of Burien:

- | | |
|------------------------------------|----------------------------|
| • Highline School District No. 401 | • Burien Toyota |
| • Highline Community Hospital | • Group Health Cooperative |
| • Wizards Restaurant | • Fred Meyer |
| • Puget Sound ESD | • Millennium Ford |
| • Burien Terrace | |

These employers are the primary employment sources within the City (City of Burien 2003).

Burien's History

Burien's downtown historically served as the business center for the greater Highline area. Highline's boundaries can be loosely defined as the Highline School District, encompassing most of the White Center Area, Burien Boulevard Park, the City of SeaTac, the City of Normandy Park and parts of the City of Des Moines (see Figure 4.1-1). Until the 1990's very little of this area was incorporated; the only cities were Normandy Park and Des Moines. The City of Des Moines was a much smaller entity than it is today.

Various communities within the greater Highline area have had a long history of interaction, including several attempts at incorporation. In recent years, the Cities of SeaTac and Burien have incorporated, and Des Moines has expanded to include much of the North Hill area. Today most of the area is incorporated with only the White Center Area and Boulevard Park area to the north of Burien. As seen in Figure 4.1-2, the White Center/Boulevard Park area and the City of Burien contain the largest concentrations of population within the Highline area.

4.1.3 Anticipated Community Change

Downtown Redevelopment

One of the most significant economic developments in the City of Burien is the redevelopment of downtown. The redevelopment process for the Burien Town Square started in earnest in 1999 when the City Council adopted the downtown Burien vision, plan, zoning and design guidelines. One of the goals of the plan was to “Enhance the distinctive character and viability of downtown Burien, and reinforce it as the focal point of the community.” The City Council rezoned the downtown to allow building heights between 5 to 8 stories (and up to 12 stories with City Council approval) to enable the downtown to become a town center for Southwest King County.

In May of 2002 the City began the reconstruction of SW 152nd Street which aimed to improve its safety for both pedestrians and vehicles and to promote long-term economic security for the business area.

The \$6.3-million project is the largest in Burien’s history and updated the 50-year-old water main and drainage system under the roadbed, constructed two through lanes, increased the number of parking spaces, improved street lighting, and added trees and other landscaping to Burien’s main shopping district.

To make the shopping street more pedestrian friendly, the City added benches, flowerbeds, kiosks for posting news of community events, and public artwork. The project was completed in July of 2003.

In 2002, the City Council appointed a steering committee consisting of education, business, and cultural leaders to create a detailed plan for the downtown. The adopted plan integrates retail, office, cultural and civic uses around a variety of public open spaces.

The last significant step towards realizing the City’s goal of a vibrant downtown was taken when the City purchased 6.41 acres of land adjacent to the City owned 1.14 acre City Hall property, and signed a letter of intent with the Puget Sound Educational Service District (PSESD) relating to the future purchase of its 2-acre parcel.

At the time this document was being prepared the City was in the process of selecting a developer to partner with the City to redevelop a 10-acre area in the heart of downtown. Construction is anticipated for part of the project in 2004. However, the full project could occur in phases over the next five to ten years.

SeaTac Airport Activities and Potential Expansion

The SeaTac International Airport, which is located completely within the borders of City of SeaTac, comprises a significant portion of the Highline area. While the airport dominates the area economically, most of the economic stimulus occurs east of the airport where the terminals are located. The runways form a barrier for air related

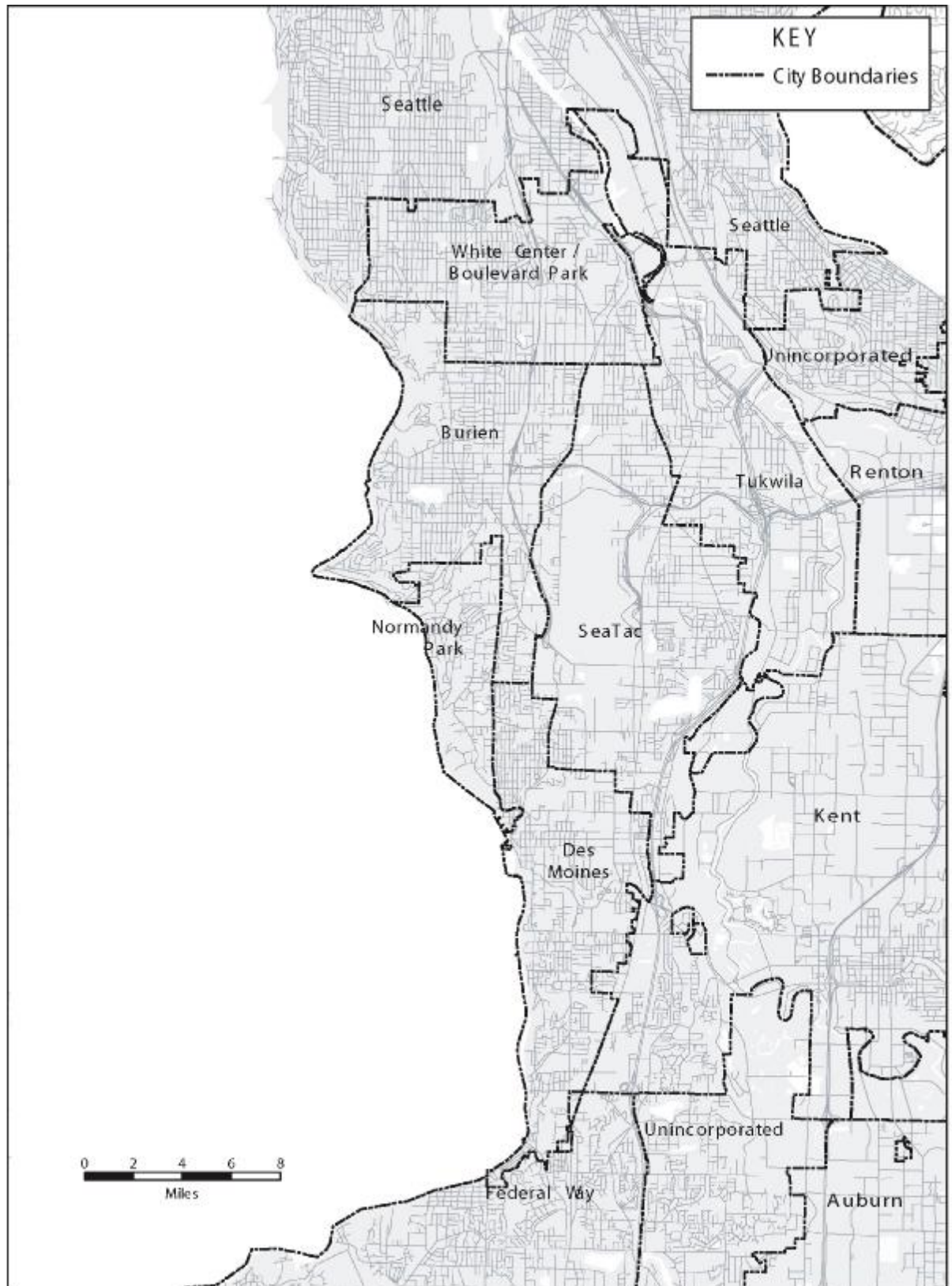


Figure 4.1-1 - Vicinity Map Highline Area

November 2003



Source: King County GIS 2003
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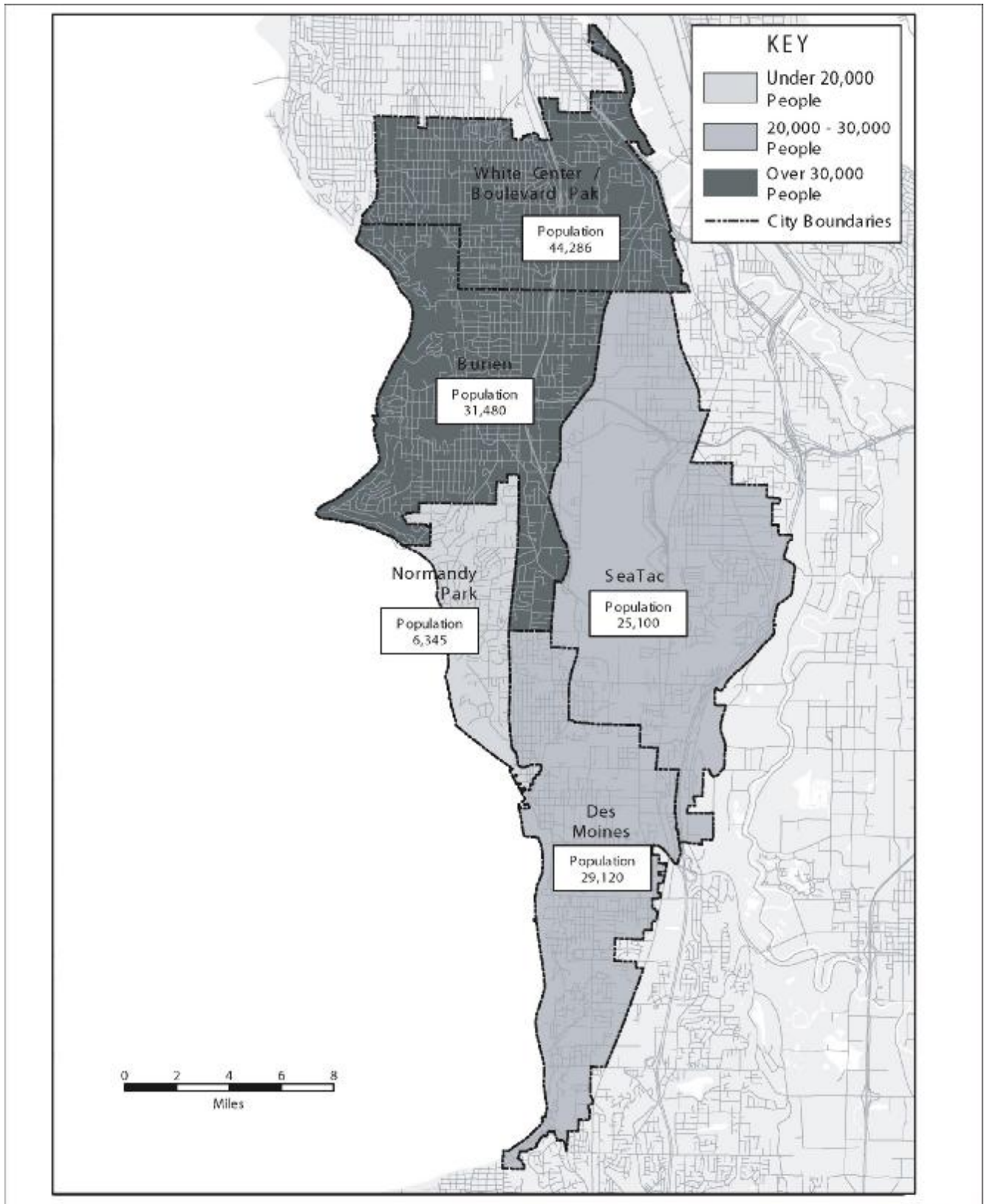


Figure 4.1-2 - Population Concentrations in Highline Area

November 2003



Source: US Census (2000), Washington State Dept. of Financial Management - 2003 Population Estimates
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economic activity, diverting it to the east as far as the Green River Valley rather than into the other “airport communities.” For the “westside cities,” the impact is instead largely negative as residential and commercial amenities are lost due to the adverse affects of noise and visual impacts of the air traffic shadow. The Port of Seattle plans to construct a new runway on the westside of the airport, approximately one half-mile west of its existing western-most runway. If the third runway is constructed, significant adverse environmental impacts should be mitigated to the maximum extent allowed by law.

Regional Highway Projects

Another major external project affecting the city is the planned extension of State Route (SR) 509 to the south of the city to link with Interstate 5. As originally planned, SR 509 was to be an alternative route from I-5 into the Seattle industrial area. However, funding has prevented its completion as planned. Currently, the State Department of Transportation is studying alternatives to complete the connection to I-5.

4.1.4 Planning Areas and Patterns of Growth

The planning area for the Burien Plan is the incorporated limits of the City of Burien. The community’s role in the region has generally been two-fold; as a residential community and a commercial center.

The community serves as a residential area supplying housing opportunities for employment centers in other areas of the county; most notably the Seattle city center and the growing industrial and commercial areas in the Green River Valley. This role has not changed significantly in the last two decades.

As in the case of the Highline study area, multifamily housing complexes have dominated new housing growth over the last 15 years. Within Burien, multifamily housing is primarily located near the city center and the area south of Highway 518 and east of Highway 509. The lack of growth of single family development has not been due to the lack of opportunity, since substantial infill opportunity exists under county zoning. Instead, this lack of growth is due more to the adverse impact of the heavy air shadow from the airport. For example, the northeastern area of the City could accommodate several times its current number of single family units. However, because of its close proximity to the airport runways and flight path, this development potential has not been achieved.

Burien’s other role is that of commercial center for the Highline area. Unfortunately its competitive advantages have eroded over the years due to growing competition from newer shopping malls, most notably Southcenter in Tukwila and SeaTac Mall in Federal Way. Nonetheless, it still maintains significant niches of commercial activity, most notably in auto sales, where it still serves as a regional center.

4.2 POPULATION CHARACTERISTICS

This section provides an overview of Burien's population characteristics. This information is based on the *2003 Demographics Report*² prepared by the City, which primarily reports upon 1990 and 2000 US Census Bureau data.

4.2.1 Overview

The City of Burien has had little population growth over the past decade. As of 2000, Burien had a population of 31,881 and was the state's 27th largest city in Washington (out of 169) and the 11th largest city in King County (out of 39). Since incorporation in 1993, Burien's population has increased mainly through annexation. The most recent annexation, the Manhattan neighborhood, was annexed into the City in 1999 and added approximately 2,500 residents to the City.

Future population growth will be dependent on realizing increases in housing density primarily in the downtown area as envisioned in the Comprehensive Plan. Other factors, such as economic conditions and the proposed buyout of airport impacted lands, could also change the pace of population growth in this area.

Burien has an older, stable population. With 14% of the population over 65, Burien has a higher rate of seniors than the county average of 10%. In addition, more than 38% of Burien residents have lived in the same place for more than 10 years while 52% of Burien residents have lived in the same place for more than 5 years. Both of these are significantly higher than the averages of the County and surrounding communities.

The characteristics of Burien's people vary significantly from neighborhood to neighborhood. Figure 4.2-1 illustrates the concentrations of population in each of the city's census tracts. Burien is a diverse community; ethnic and racial diversity has increased significantly over the past decade. Since 1990, the proportion of minorities has increased from 11% to 26% in the general population, or slightly above the County average of 20% minority, but less than the South Central King County average (33%). There has been an even greater change in the Burien public schools, where the proportion of minorities has changed from 26% in 1992 to 47% in 2002. The percentage of foreign born residents has also increased from 7% in 1990 to 15% in 2000.

The Hispanic population has seen the most significant growth. The Hispanic population in Burien has increased from 3% of the total population in 1990 to 11% in 2000. As such, the Hispanic community now comprises the largest minority group in Burien. The Burien public schools also reflect a similar change; the increase in this group's population rose from 6.5% of total enrollment in 1992 to now comprise 20% of enrollment in 2002.

² Demographics Project: Community Profile, City of Burien, April 2003.

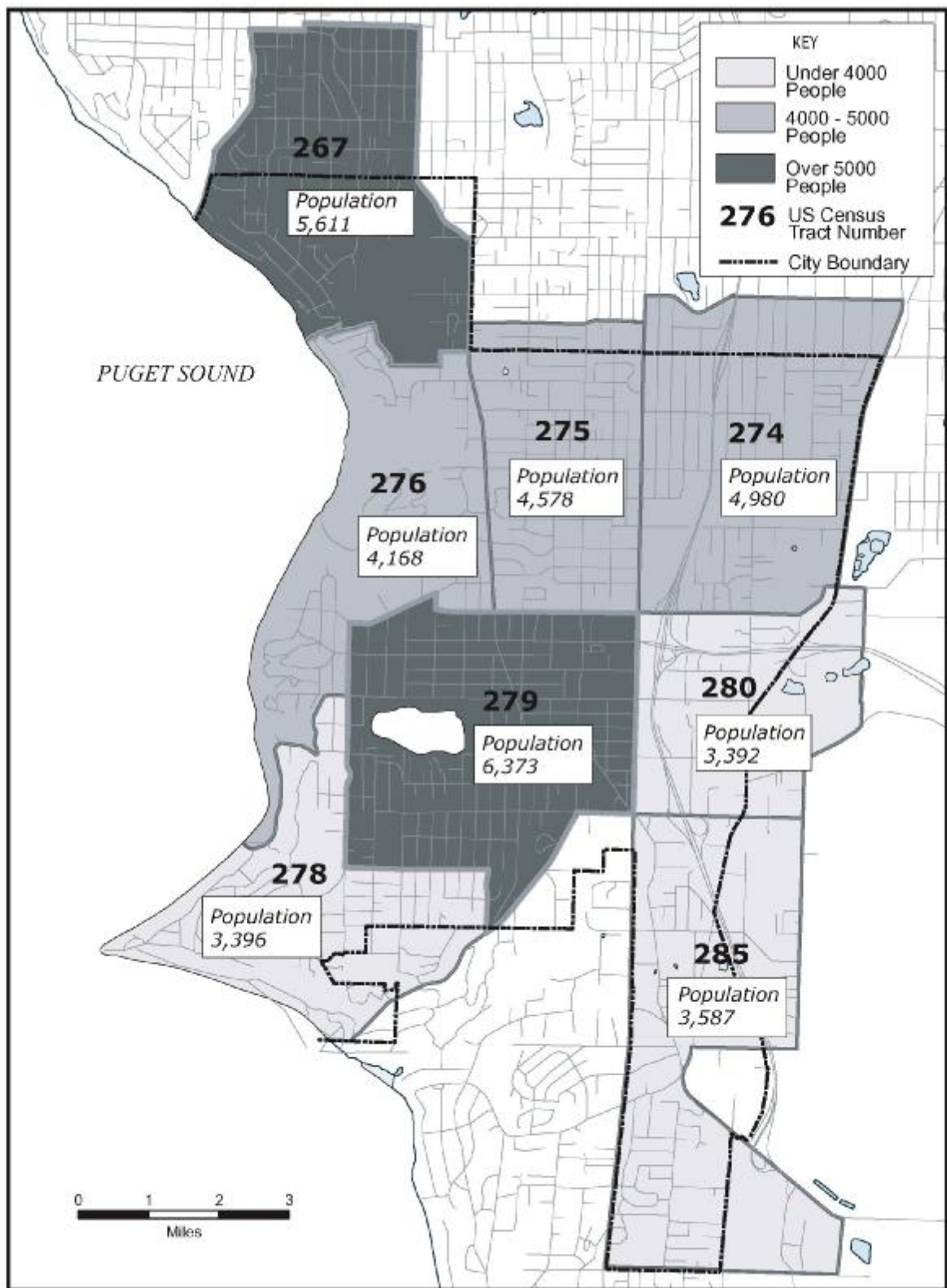


Figure 4.2-1 - Population Concentrations in Burien

November 2003



Source: King County GIS, US Census Bureau, 2000
p11e06.01 Burien_Crit_Comp/Graphics/Figures/FinalPDFs/Figure421.pdf

Back of Figure 4.2-1 Population Concentrations in Burien

Public School population in Burien has seen a slight decrease over the past ten years. The 2002 Burien public school population of 4,787 is a decrease of 4% since 1992 and mirrors the Highline School District static enrollment over the past ten years.

Employment opportunities in the community are primarily provided by service and sales sectors. The majority of Burien residents work in these industries, whereas fewer residents are in the management and professional fields. In 2000, significantly more Burien residents (45%) were employed in service and sales than King County (39%). In contrast, significantly less residents (30%) were employed in the management and professional occupations than King County (43%).

Figure 4.2-2 illustrates the median household income of population in each of the city's census tracts. Income levels for two-thirds of Burien residents are sufficient to finance homes or rent apartments. However, many of Burien residents spend a substantial amount of their income on housing. In 2000, one out of three Burien residents (32%) spent more than 35% of their income on housing for both home owners and renters. This is higher than the County's average of 25% for owners and 30% of renters who spend more than 35% of their income on housing. The percentage of income paid by owners increased most significantly in comparison to renters between the years 1990 and 2000. This increase most likely reflects the increased cost of housing during this 10-year period.

4.2.2 Population Characteristics in Regional Context

This section describes the characteristics of the people who live in the Burien Community in comparison to neighboring jurisdictions. It seeks to provide an understanding of the community compared to the following neighboring jurisdictions:

- White Center / Shorewood area (Shorewood is within Burien city limits)
- Riverton Heights / Boulevard Park
- Normandy Park
- Des Moines / North Hill Census Designated Place (now part of Des Moines)
- SeaTac
- Tukwila

Information for Washington State, King County, and Seattle have also been included in most of this information to provide additional context for Burien and Southwest King County. The following facts, reported by the 2000 US Census, summarize Burien's population status in comparison to southwest King County communities:

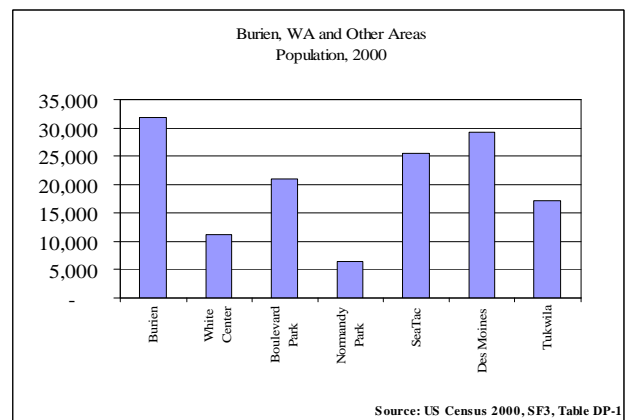
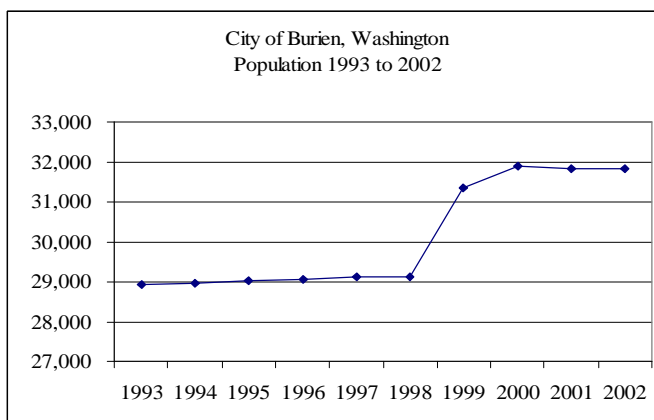
- Burien has the oldest median age (38.4);
- Burien has the second highest percentage of persons 65 year and older (13.8%);
- The increase in Hispanic/Latino population from 1990 to 2000 has been higher in the South King County cities (between 3.5% and 9.9%) than King County (2.6%) or Seattle (1.7%);
- Burien has the highest percentage of non-family households among SeaTac, Tukwila, or Des Moines (39.8%), but less than Seattle (56.1%) or King County (40.9%); and

- Burien has a higher percentage of very large multi-family rental units (more than 20 units) than the King County Average (19% vs 16%).

Population

Burien's population was 31,881 in the 2000 census. This has remained fairly stable since incorporation with the only change in population taking place in 1999 after the annexation of the Manhattan area. In comparison, King County's population grew by 15% to 1.7 million people from 1990 to 2000, while the state grew at 9.1%.

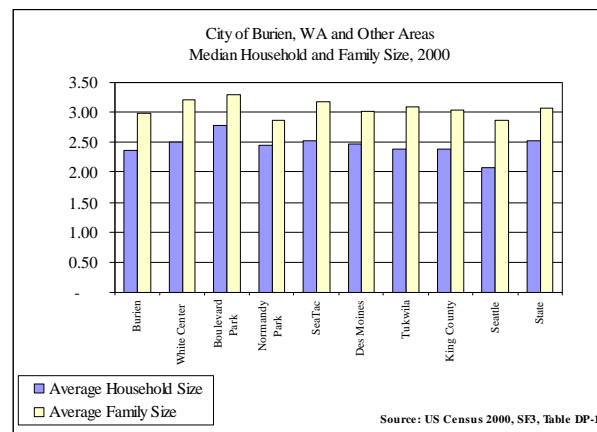
Compared to the surrounding areas, Burien is similar in size to Des Moines and the combined population of White Center/Boulevard Park.



Note: In 1999, the City of Burien annexed the Manhattan area which caused the majority of this increase.
Source: 2000 US Census

Household Characteristics

The City of Burien, unlike the county and state, saw a 5% increase in average household size from 1990 to 2000. This is also reflected by the greater increase in the number of children under 18 within the last ten years compared to other age groups. This increase in youth will require additional city and school services.



Families still comprise 60% of all households in Burien, similar to the County average, and the average family size has increased. In other jurisdictions, the proportion of families as a percentage of all households is decreasing. In general, Burien and most of its surrounding communities increased in both the size of households and in the percentage of families.

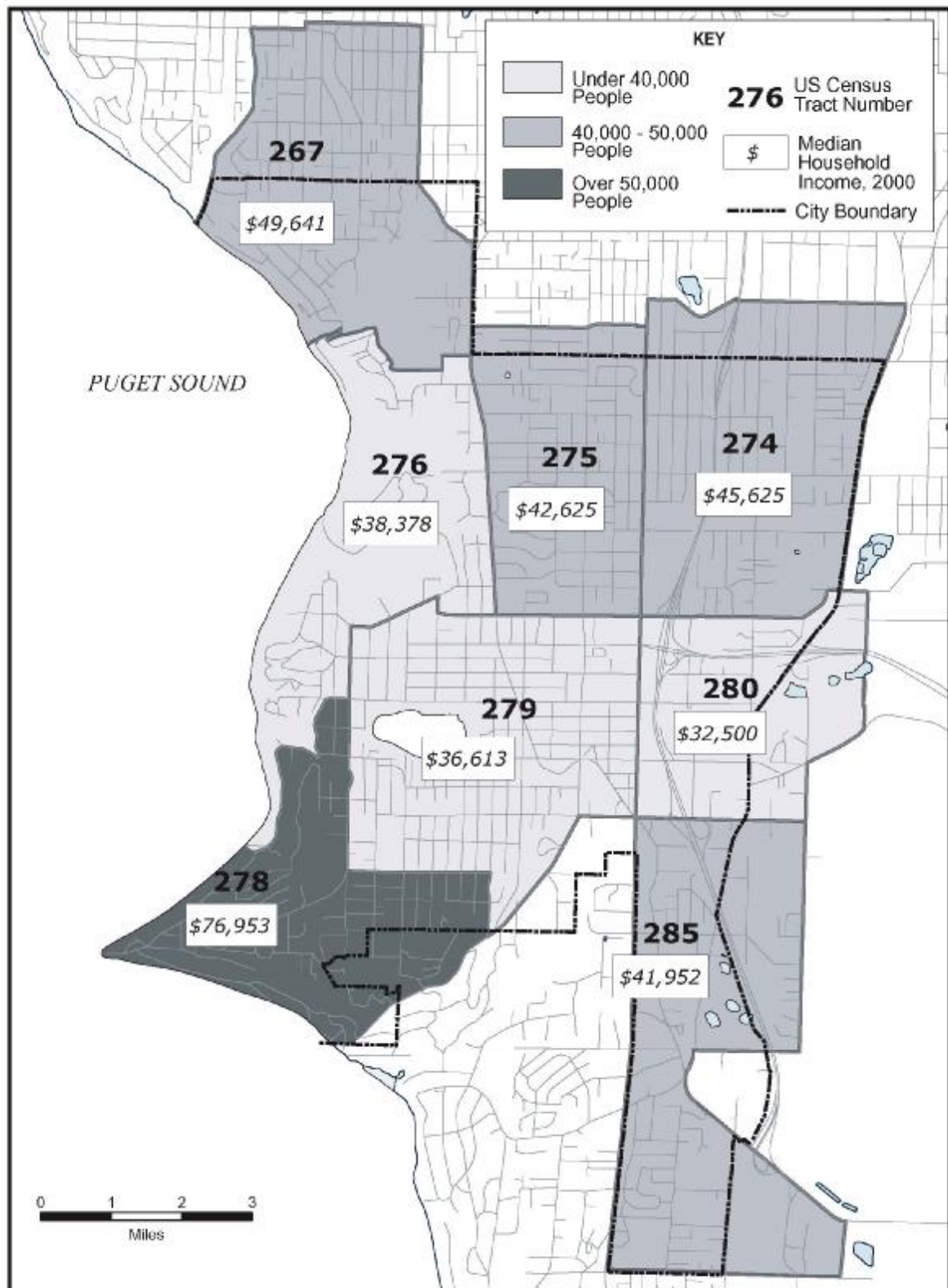


Figure 4.2-2 - Median Income by Census Tract

November 2003



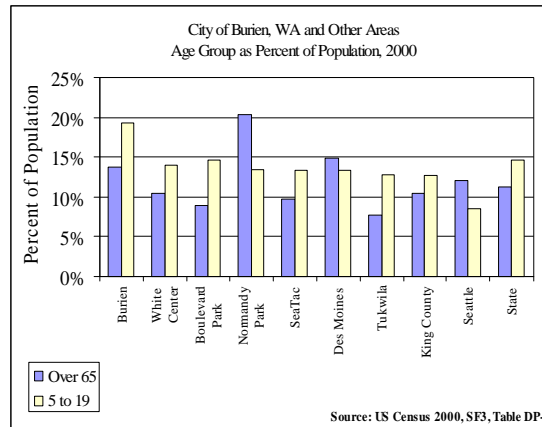
Sources: King County GIS, US Census Bureau, 2000
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Back of Figure 4.2-2 median household income by census tract

Burien has an average household size compared to King County, but it is actually slightly below the surrounding communities. This growth in household size in the past year may be the realization that Burien is impacted by and reflects more of its adjacent neighbors.

Age Groups

A basic characteristic of Burien's population is age. At 14% of the total population, Burien has a higher senior population (over 65), than the rest of King County and most of the surrounding communities, only Normandy Park and Des Moines have a slightly higher percent. In 2000, the percentage of seniors actually decreased by 8%. The biggest change was a 5% increase in the percent of children age 5 to 19. Comparatively, every other jurisdiction saw a decrease as a percent for this same age group. The challenge for Burien will be to ensure that it incorporates these younger people into the community.

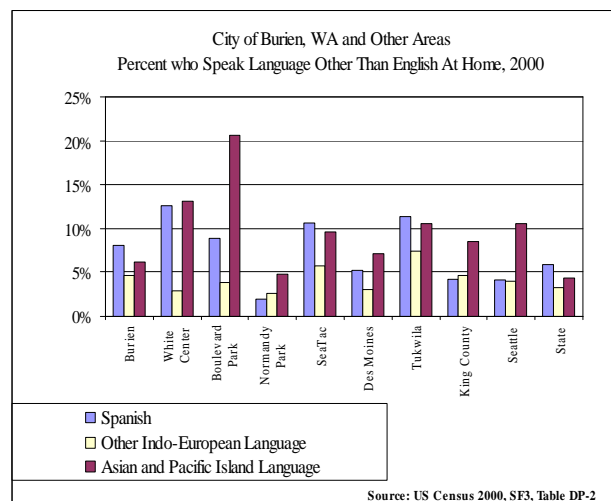


Race / Ethnicity

Similar to most areas throughout the U.S. and King County, the City of Burien also became increasingly diverse between 1990 and 2000. Minorities increased from 11% of the City population in 1990 to now comprise 26% of the population, eclipsing the growth experienced in many communities in King County. Burien has twice the county average percent of Hispanic persons, but about one-half the average percent of Asian persons. The surrounding community also reflects a greater diversity than in King County, especially in the areas north of the City. As the adjacent chart indicates, other communities surrounding Burien are more diverse than the County and State averages, except for Normandy Park.

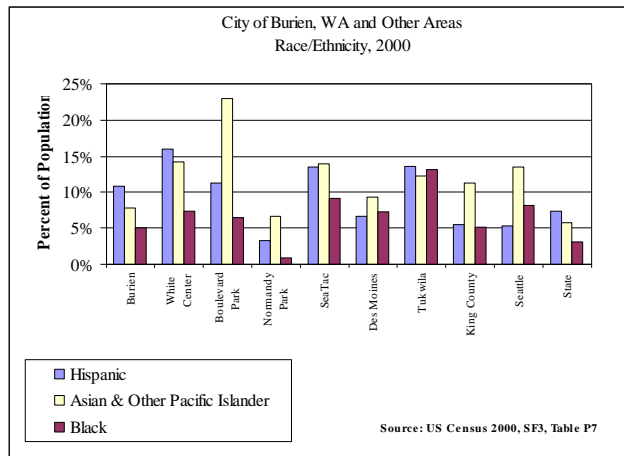
Foreign Born

The increasing number of foreign born residents increases the diversity of a community, but also can add additional strains on a community as it works to meet these different needs, for example in language services. Burien reflects the county in this measure, but many neighboring cities have a much higher percent of foreign-born residents.



Language

The percent of the population who speak a language other than English at home has doubled in the past ten years for Burien. About one-half of these persons do not speak English very well. This mirrors the experience in most other jurisdictions. Spanish is the main other language spoken in Burien. This translates into one out of five people in Burien speak a language other than English in their home and that one out of 10 people do not speak English very well. This is an important issue to address when determining access to services.



Spanish is the language second most often spoken language in a Burien household next to English. In many of the surrounding communities, Asian languages are the second most spoken language then followed by a higher than average percentage of Spanish speakers.

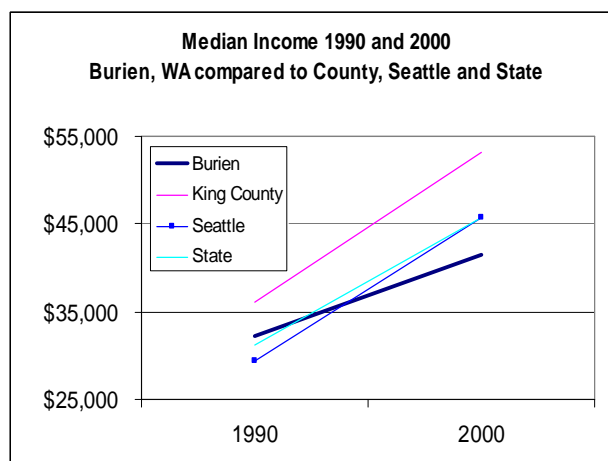
Approximately 49% of other language speakers do not speak English well in Burien. This is an increase from 33% in the 1990 census. There is a higher than average number of Spanish speakers who do not speak English well as compared to King County, Seattle, and the State, but this is lower than most of our neighboring communities. Burien has a slightly lower than average number of Asian language speakers who do not speak English well, but this is still at 48% of all speakers.

Educational Attainment

Approximately 20% of the population has received a bachelor's degree or attained a higher level of education. Burien has fewer high school and college graduates than King County as a whole, although this rate is more than the neighboring communities.

Median Income

Another key population characteristic is income. Income influences not only potential need and demand for commercial and governmental services but also the ability to pay for them. The slower than average growth in median income was one of the main issues of concern when the 2000 US Census data first came out. A median income that does not grow at the



average rate is often an indicator of the economic health of the community and influences retail business growth and demand for government services.

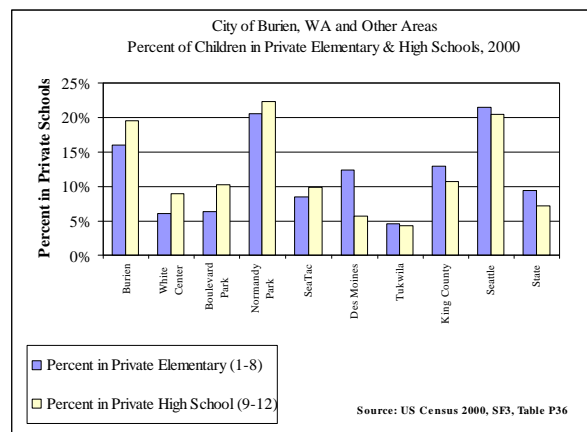
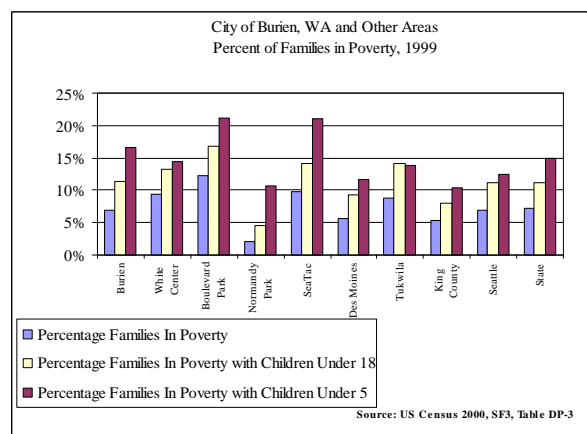
One researcher on urban poverty stresses that when a jurisdiction's median income falls below 70% of the median state or county median income, it is of serious concern. It signifies that there is a great gap between those with wealth and those without and is probably a better marker of "poverty" than the fixed poverty level which is often used. Burien and most of the surrounding communities are close to 70% of the County median income in 2000.

Burien used to have a higher median income than Seattle and the state average. In the 1990's, the State and Seattle both experienced increases of nearly 50% in median income, which was almost twice the growth in Burien.

Poverty

Burien has a higher percent of families and children in poverty than the county average. Burien has one of the highest rates of poverty in families with children under 5. Only Boulevard Park and SeaTac have higher rates.

Burien has more individuals on Social Security and Public Assistance than the County and State average. Trends identified in the *2003 Demographic Report* indicate that there are more people receiving income from public assistance in the City, while the state and county are receiving less. Burien also has a historically higher percentage of children with both parents in the labor force; this percentage is increasing at a faster pace than most other jurisdictions. More families have two-wage earners which means that there are more children who may need childcare and after/before school programs.



At the same time, the *2003 Demographic Report* states that Burien has a high percentage of children in private schools. A strong demand exists for private schools in the area, which may reflect the availability of these options and/or the perceived lack of quality of the public schools. Only Normandy Park and Seattle have a higher percentage of children in private schools, and both of these communities have a higher average income than Burien to afford private schools.

4.2.3 Estimated Future Population, 2000 – 2020

This section of the plan addresses estimated future population change, as opposed to past trends and current population characteristics as previously discussed. Determining and planning for the needs of the changing population in relation to the Burien Vision is a key part of the comprehensive planning process.

The Burien Plan will guide the City towards achieving our Vision over the next 20 years. To plan for the City now and in the future, the number and characteristics of future City residents needs to be anticipated. Looking at past population trends and applying them to future populations is one way to accomplish this task. Once a “picture” of the future population trends is developed, the policy implications can then be assessed. For example, if population trends indicate a certain phenomena, such as a shift in population peaks, or a significant decrease/increase in a particular age group, what does this imply for the provision of city services, facilities and housing? Moreover, does the City want to make policy directives which may shift the trend so that a different outcome in the population distribution occurs?

Cities planning under GMA are required to update their comprehensive plans regularly to account for changing circumstances. Jurisdictions are to use the Washington State Office of Financial Management (OFM) and Puget Sound Regional Council (PSRC) data in this process. Changes in the planning targets or goals for population will affect several elements in the Burien Plan. For example, if a jurisdiction’s population planning target rises, the housing element of the comprehensive plan must identify land to meet the housing needs of the additional residents. Traffic forecasts must be updated and the transportation element of the Burien Plan must set out specific actions to assure that local transportation facilities continue to meet established level-of-service standards. Similarly, the capital facilities element of the comprehensive plan must be adjusted to accommodate the additional population.

Table 4.2-1 provides a summary of estimated population in King County and Burien to the year 2020. The PSRC estimates that King County will increase in population from approximately 1.7 million to over 2 million residents by 2020, or by 17%. Population growth in Burien is expected to continue as well, albeit at a slower pace than the County.

Table 4.2-1 Population Estimates 2000 - 2020

Area	Actual 2000	Estimated 2010	Estimated 2020	Population Change 2002-2020	Percent Change 2002-2020
King County	1,737,034	1,869,695	2,039,985	302,951	17%
City of Burien ¹	31,881	34,338	35,272	3,391	11%

Source: PSRC 2002; US Census 2000.

Growth assumed for the City of Burien is based on several factors. The 2000 US Census data indicate that the State’s population continues to grow, but at a slower pace, which reflects the slowdown in the national economy that began in 1999 and 2000. The rate of growth in Western Washington has been slowly declining; annual population growth has

steadily declined by over 3% in the early 1990s to 1.9% in 1995 and to 1.2% in 2002. Annual growth in 2002 is at its lowest annual growth rate since 1983 (OFM 2003).

Based on the declining annual population growth rate in Western Washington and the regional growth anticipated by the PSRC for the Burien/Seahurst area (FAZ No. 3815), population growth in Burien is assumed to increase at an annual population growth rate of approximately 0.5% until the year 2020. At this rate, Burien's population would increase to 35,272 residents over the next 20 years, or an increase of 11%. This population change would introduce an additional 3,391 residents to the City during this time period, which is indicative of a moderate level of growth over time. However, it is important that the Burien Plan be flexible enough to accommodate the growth that actually occurs if the future pace of growth is accelerated or decelerated.

4.3 BURIEN'S NATURAL ENVIRONMENT

Burien's natural environment includes earth, water resources, floodplains, shorelines, plants and animals, air quality, scenic resources and energy. This section discusses each of these components in order to provide a baseline of existing conditions for this Comprehensive Plan.

4.3.1 Earth

Elements of the earth include topography, geology, soils, geologic limitations and seismic potential.

Topography

The City of Burien has predominantly upland land features typical of the glaciated Puget Sound region. Burien is characterized by gently rolling terrain, with elevations between 300 and 400 feet mean sea level (MSL), mapped on Figure 4.3-1. The highest elevations, around 400 feet MSL, are found in the northeastern part of the City. Along the western part of the City along the Puget Sound shoreline, the upland areas drop abruptly from 300 feet MSL to sea level. The slopes along these bluffs range from steep to very steep, often exceeding 40%. Spring-fed creeks and upland streams have produced numerous steep-sloped ravines in this area.

The steep slopes areas primarily occur along the bluffs and ravines above the Puget Sound coastline which forms the city's western boundary. These high sloped areas offer excellent views of Puget Sound and the Olympic Mountains as well as challenging, development conditions. Providing infrastructure such as streets, water and sewer in these topographically constrained areas increases the construction and maintenance costs of these facilities. Once constructed, these facilities may be subject to periodic or seasonal landslides that may restrict or block access to both public and private property. The City of Burien recognizes that specific topographic areas are prone to natural hazards and have been working with King County cities and special jurisdictions to establish preventative measures to reduce risks of potential damage to infrastructure or injury. The King County Regional Hazard Mitigation Plan, adopted in 2003, culminated from this

effort. The Regional Hazard Mitigation Plan is in addition to the 2002 City of Burien Emergency Operations Plan, which addresses the City's coordinated response to disasters in progress.

Geology

The glacial drift plain underlying Burien is a composite of several different glacial depositional processes. The processes include lacustrine (lake) deposits, which are predominantly silt and clay; glacial till, a mixture of sand, gravel, clay, silt and boulders deposited directly by the glacier; and advance and recessional drift, largely sand and gravel deposits made by glacial meltwater. The deposits made by these processes are layered.

The majority of the surficial geology of the upland areas is glacial till. In the Miller Creek and Salmon Creek valleys, surface geology largely consists of recessional outwash deposits formed by glacial meltwater streams. Along the steep bluffs overlooking Puget Sound, more recent glacial deposits have been removed by erosion. Therefore, surface exposures of older advance outwash and glacial lake deposits are common in these areas.

Soils

There are distinctive soil differences between the upland areas, major stream valleys, and the Puget Sound bluffs within the City. In upland areas outside of the river valleys, local soils are predominantly Alderwood series, derived from glacial till. In general, these soils have very slow permeability, imposing severe limitations for septic tank drainfields, and presenting a moderate erosion potential in areas with moderately sloping terrain.

The valleys of Miller and Salmon Creeks have predominantly Everett recessional outwash deposits. These soils are very permeable, which also imposes severe limitations on the use of septic systems due to increased potential for groundwater contamination from septic tank effluent. However, these soils present only a slight erosion potential due to this permeability.

The bluffs and valley walls bordering steep-sloped ravines in the lower reaches of Salmon and Miller Creeks include Alderwood, Kitsap and Indianola series soils. These soils have very slow permeability, imposing severe limitations on the use of septic systems and presenting severe erosion hazards. At the base of the bluffs, narrow strips of coastal beach series soils are also found. These soils also present severe limitations for septic systems due to tidal flooding.

Geologic Limitations

Erosion hazard areas are defined as those lands susceptible to erosion of their surface by water, wind or gravitational creep. The two primary determinants of these areas are soil type and slope. The U.S. Department of Agriculture Soil Conservation Service identifies lands or areas underlain by soils having "moderate to severe," "severe," or "very severe" erosion potential. These soils contain high percentages of silt and very fine sand. As the

Back of Figure 4.3-1

clay and organic matter content of these soils increase, eroding decreases. Clays act as a binder of soil particles and reduce eroding. However, once clays are detached from the soil, they are easily transported by water and settle out very slowly. Well-drained and well-graded gravels and gravel/sand mixtures are the least erodible soils. Coarse, gravel soils are highly permeable and have a good absorption capacity which prevents or delays, and thus reduces, the amount of surface water runoff.

In Burien, geologic hazards (mapped on Figure 4.3-1), are largely concentrated in the bluffs along Puget Sound and in ravines in the lower reaches of Salmon and Miller Creeks, where soil types, steep slopes and ravines, spring fed creeks, and upland streams combine to create unstable lands. In these areas, steep and very steep slopes (often in excess of 40%) and surface or near-surface exposures of relatively impermeable clay and silt deposits contribute to Class III Landslide Hazard Areas. Class III Landslide Hazard Areas are the greatest landslide hazard potential recognized by King County (King County, 1990; ST Engineering, 1985). Landslide Hazard Areas are found in parts of Shorewood, Seahurst, Seahurst Park, Salmon Creek Ravine, and the Three Tree Point area. The City of Burien recognizes that specific topographic areas are prone to natural hazards and have addressed them in the King County Regional Hazard Mitigation Plan, adopted in 2003, and the 2002 City of Burien Emergency Operations Plan, which addresses the City's coordinated response to disasters in progress.

Special precautions, development standards, and best management practices should be instituted prior to development in erosion and landslide hazard areas. While the best potential for view property often occurs on steep slopes overlooking Puget Sound, development on overly steep slopes/unstable areas can be risky in terms of human safety, and the sustainability of the environment due to drainage, erosion, and landslide hazards.

For example, uncontrolled storm water runoff and seepage from springs works to disturb soils, contribute to erosion and aggravate landslide problems experienced on steep slopes. Storm water runoff traveling at high velocities through a stream channel also has the potential to destroy wildlife habitat by scouring the streambed and denuding vegetation. Consequently, special attention should be paid to the management of any development occurring on steep slopes.

Seismic Potential

Damage from earthquakes is caused primarily by ground shaking. The severity of the ground shaking depends on the distance from the earthquake epicenter, the magnitude and duration of the earthquake, the nature and thickness of surface and subsurface geologic materials, and subsurface structures. Surface faulting and sudden ground elevation changes (subsidence and uplift) can also result in damage. Earthquakes may also trigger landslides, soil compaction, liquefaction of water-saturated deposits, and inundation from seismically induced water waves (tsunamis and seiches).

The "Nisqually" Earthquake, which occurred February 28, 2001, illustrated the susceptibility of steep slopes in Burien to earth movements. The magnitude 6.8 earthquake occurred 32 miles below the Nisqually wetland north of Olympia, WA and

was felt by most areas within the Puget Sound region. Eight homes on a geomorphic bluff in the Three Tree Point Neighborhood and portion of Maplewild Avenue SW in Burien were damaged as a result of a landslide triggered by the earthquake. Most other areas of the City were unaffected.

Valley soils along the lower reaches of both Salmon and Miller Creeks present potential seismic hazards. No seismic hazards are identified in the upland areas however, areas identified as potential landslide hazard areas are considered to be at increased risk during earthquakes. Areas of the city at risk from seismic-related hazards are mapped on Figure 4.3-1.

The City of Burien recognizes the area's seismic potential and has addressed it in the King County Regional Hazard Mitigation Plan, adopted in 2003, and the 2002 City of Burien Emergency Operations Plan.

Volcanic Activity

The Cascade Range of the Pacific Northwest has more than a dozen potentially active volcanoes. The City of Burien would be most affected by volcanic activity associated with Mount Rainier, located approximately 80 miles southwest of the City. Cascade volcanoes tend to erupt explosively, and on average two eruptions occur per century—the most recent eruptions were at Mount St. Helens, Washington (1980–86). Mount Rainier has produced at least four eruptions and numerous lahars (mudslides) in the past 4,000 years. It is capped by more glacier ice than the rest of the Cascade volcanoes combined, and parts of Rainier's steep slopes have been weakened by hot, acidic volcanic gases and water. These factors make this volcano especially prone to landslides and lahars. An eruption of Mount Rainier could affect Burien by triggering landslides, soil compaction, and liquefaction of water-saturated deposits in the region. To help protect the Pacific Northwest's rapidly expanding population, USGS scientists at the Cascades Volcano Observatory in Vancouver, Washington, monitor and assess the hazards posed by the region's volcanoes (www.geophys.washington.edu).

4.3.2 Water Resources

Water resources include aquifer recharge areas and ground water, surface water resources and wetlands.

Aquifer Recharge Areas and Ground Water

Precipitation released from the snow pack, lakes, streams, rivers, oceans, or wetlands, seeps into the soil where it is taken up by plant roots, or infiltrates into the ground where it becomes ground water. As the ground water travels through the ground, it may discharge to surface features such as lakes, streams, or rivers. The water that remains in the ground may be contained in an aquifer.

Wells can be used to tap into aquifers to provide a source of water for many jurisdictions, including Burien. The Highline Well Field (a series of aquifers) is one of three sources

of water supply for the Seattle Water Department (SWD). SWD is the largest purveyor of water in the state with almost 40% of the Department's available water purchased by water purveyors, including those serving Burien. The Highline Well Field lies in the area north of SeaTac International Airport. The Highline Well Field recharge area spans an area that includes the northeastern portion of Burien.

There are three principal aquifers beneath the Highline area which are located in permeable sand and gravel substrata. Each of these aquifers is separated by layers of relatively impermeable materials. The shallowest aquifer is recharged by infiltration from precipitation in upland areas (particularly in areas such as Miller Creek and Salmon Creek), and from ponded water beneath upland lakes. Most surface water features, including lakes, streams and springs, interact with the shallow aquifer as either areas of discharge or recharge. The bluffs along the Puget Sound shoreline are the principal locations of groundwater discharge through springs and seeps.

Aquifer recharge occurs primarily as a result of the infiltration of rainfall, and secondly by the movement of water from adjacent aquifers or water bodies. The rate and quantity of water entering the ground depends on several factors. Natural factors include amount of precipitation, soil type and conditions, vegetation, and topography. Man-made factors include impervious surfaces associated with development, the channeling of runoff, changes in soil condition such as compaction, and removal of vegetation. Aquifers can also be effected by contamination. A hazardous waste spill can have severe adverse impacts on an aquifer, possibly making the water unusable for years. The critical areas map indicates locations of aquifer recharge areas (see Figure 2-EV1 in Chapter 2).

Surface Water Resources

As can be seen on Figure 4.3-2, the City of Burien is divided into seven drainage basins - Seola Creek, Puget Sound (two basins), Salmon Creek, Hermes Depression, SW 142nd Street Depression, and Miller Creek. Miller Creek is the largest of the basins, draining an area of approximately 5,230 acres. Salmon Creek is the second largest system, draining 1,390 acres. Drainage is predominantly to the west towards Puget Sound, although both of the major streams flow in a general southwesterly direction. Salmon Creek originates in the City of Seattle, flows through the White Center area, and terminates in Puget Sound in the northwest corner of the City. Flows from this basin are somewhat attenuated by a series of degraded wetlands and small lakes, including Garret Lake, all of which are outside the City of Burien.

Miller Creek originates in numerous bogs, lakes, and depressions in the plateau that comprise the bulk of the Burien-SeaTac land area. Miller Creek is formed through a system of seven tributaries. Miller Creek receives drainage from the Burien commercial area, State Highway 509, Sea-Tac Airport and an extensive area in King County. The main stem of Miller Creek is only partially in the City of Burien.

The characteristics of the stream channels and stream flows in Miller and Salmon Creeks are typical of urbanized streams. Channelization, culverting, fill and other man-made changes have extensively modified both streams. During storms, the peak volume of

water conveyed by the creeks is both greater and occurs in less time than it would if the drainage basins had remained in a natural, or undeveloped state. This increased stream runoff increases the potential for streambed scouring and the amount of flooding and sedimentation that could occur in downstream areas. The Puget Sound drainage basins include a series of small basins composed of steep hillsides sloping down from the Burien Plateau area to the Puget Sound. Each basin collects ground water outcroppings and urban runoff, and forms streams of varying sizes, some quite large as in Seahurst Park, and others as intermittent spring-fed creeks. Increases in development and impervious surfaces within these basins, combined with the effects of uncontrolled runoff from development, have caused a number of serious erosion and slide problems in each of these basins.

Lake Burien is the only lake located within the City of Burien. Private residences border the lake, and there is no public access to this body of water. Lake Burien previously served as the drainage basin for a small area until a system of stormwater drainage pipes were installed on the northern side to divert runoff from the lake although several drainage points to the lake remain on the south side. Underground culverts drain the lake to the southeast.

There are a number of lakes just outside of the Burien City limits. Within the City of SeaTac there are four lakes in close proximity to Burien. Just south of SR 518 are Lora Lake and Lake Reba. Tur Lake is located just east of SR 509 and north of SR 518. Arbor Lake is located in King County, just north of SW 128th Street and west of SR 509.

Wetlands

Wetlands are transitional areas between upland and aquatic environments where water is present long enough to form distinct soils and where specialized "water loving" plants can grow. Wetlands include marshy areas along shorelines, inland swamps, and seasonal watercourses. Wetlands are typified by a water table that usually is at or near the surface, and there may be standing water all or part of the year. Soils that are present in wetlands are known as "hydric soils." Certain plant species, including trees, shrubs, grasses, and grass-like plants have adapted to the low oxygen content of wetland soils. These plants are known as "hydrophytes."

Another distinguishing characteristic of wetlands, in addition to soils and plants, is hydrology. Wetlands hydrology refers to the wetness of the wetlands: how often and how long the soil is saturated or flooded with water. Indicators of wetland hydrology may include drainage patterns, sediment deposition, watermarks, stream gauge data, flood predictions, historic data, visual observation of saturated soils, or flooded soils.

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The City of Burien wetland resources mapped on Figure 4.3-2 includes two Category 2 wetlands³ in the southeastern area of the City, totaling approximately 26 acres. In addition, just north of the Highline School District Mental Health facilities, Miller Creek flows into an open body of water less than an acre in size which is classified as a Category 2 wetland. Other significant wetland areas are found along Miller Creek, one particularly noteworthy area is located in the Miller Creek Ravine in the vicinity of 1st Avenue South and Ambaum. Puget Sound Beaches, along with adjacent creek mouths are considered particularly important wetland resources due to their use as refuge habitat by Salmonids, however these are not mapped on Burien's critical areas maps. The King County wetland inventory system also designates Lake Burien as a wetland

There may also be a number of other wetlands of smaller size located within the city. The City of Burien has adopted standards and requirements in the Burien Municipal Code which allow only very limited development and activities in and adjacent to wetlands, while striving to preserve their integrity.

4.3.3 Floodplains

The 100-year floodplain is comprised of two components: the floodway and the flood fringe. The floodway is the area of fastest moving water where damage and safety threats are the greatest. Absence of permanent structures in the floodway, such as houses and businesses, allow floodwater to move unimpeded and reduces the possibility for property damage. Only seasonal uses or water dependent facilities, such as passive-recreation types of parks, stream bank stabilization facilities or storm water facilities, should be allowed in these areas. The flood fringe is that portion of the floodway covered by floodwaters during a base flood. It is generally associated with standing water rather than rapidly flowing water.

According to the Federal Emergency Management Agency (FEMA) maps, a very small portion of the city is within designated 100-year floodplains. One of the floodplains is located in the southern part of the city along the Miller Creek Corridor. In this area, parts of the corridor have not been developed. Uses along the corridor include a low-density residential neighborhood, the Kiwanis Park/Camp Schoenwald, and some ravine areas. It should be noted that although only a few areas are designated as 100-year floodplains, there are still many other areas with drainage problems (as noted under the section on water resources).

The other 100-year floodplain is located just north of SW 142nd Street between Ambaum Boulevard and 6th Avenue SW. This area forms a natural drainage basin for the 142nd Street Depression Sub-basin. Although it is not a floodplain, the Hermes Depression is another natural drainage basin located just north of the 142nd Street Depression. Neither the 142nd Street Depression nor the Hermes Depression has a natural outflow for water

³ The City of Burien Zoning Code (19.40.300 Wetlands) defines Category 2 wetlands that do not meet any of the criteria for Category 1, but meet the following criteria: a) Greater than one acre in size; b) Equal to or less than one acre in size and have three or more wetlands classes as defined in BMC 19.10; c) Forested wetlands equal to or less than one acre; d) Documented presence of heron rookeries or raptor nesting trees; e) Documented occurrences of sensitive species of plant, animal or fish recognized by federal or state agencies; f) Associated with Type 2 or 3 streams; g) Wetlands with significant habitat value (Greater than or equal to 22 points on the Wetlands Rating Form"

that collects in these basins. Consequently, during the winter months, heavy rains cause these areas to experience severe flooding. Key floodplains are mapped on Figure 4.3-2.

4.3.4 Shorelines

The City of Burien has approximately 6 miles of shorelines along Puget Sound. Steep slopes comprise much of the coastline, in some places greater than 40%. Figure 4.3-1 depicts slope stability in the form of landslide hazards. Slope stability is interpreted as the resistance to, or lack of, a tendency for landslides. Slope stability is an important consideration in planning as demand for land for urban and recreational uses within the coastal zone is intense. As seen on the Figure 4.3-1, a significant portion of the City's coastline is designated as unstable due to geology, groundwater, or wave erosion factors. Intermediate slopes are found further landward. These slopes are viewed as less critical when considering the same factors, but may become critical and subject to landslides if disturbed.

Figure 4.3-2 depicts areas along the coastline, which are subject to flooding. As can be seen on this map, there are a few areas designated as flood hazard areas. These are areas with a potential 1% chance (100 year frequency) of flooding during any year. Areas designated as "UF" have less than a 1% chance of experiencing flooding or drainage problems during any year.

The Washington State Growth Management Act of 1990 requires cities to inventory, designate and regulate development on mineral resource lands. Figure 4.3-3 depicts sand and gravel resources along the coastline. Significant portions of the coast contain high quality sand that has a low content of silt and clay and a relative absence of oxidation effects. However, considering slope instability in this region, as well as the fact that many of these deposits may be covered by residential developments, there is little likelihood that these sands could represent an exploitable resource. Likewise, there are no other significant mineral resource lands located elsewhere within the city.

The coastal zone is a dynamic environment, where the land-water boundary is continuously modified and realigned by the forces of the sea. Therefore, it is important to identify, recognize, and understand the mechanics of littoral drift which plays an important role in beach dynamics.⁴

Figure 4.3-4 shows information on coastal drift, including beach sediment types, sources of beach materials, and relative littoral transportation⁵ rates. As can be seen in the map, the majority of the beach material is comprised of sand, with some mixed medium materials closer to shore. Along the shoreline of the City there are three drift sectors, within which uninterrupted drift of beach materials or sediments can occur. Each drift

⁴ The information included in this map provides the City with basic data to use in determining impacts of proposed land use or development along the shoreline. However, it is not intended to provide the final answers. Consequently, the displayed material should be verified through field-checks before comprehensive littoral drift analysis can be made with respect to local conditions.

⁵ The movement of sedimentary material, in a zone extending seaward from the shoreline to just beyond the breaker zone, by waves and currents. Includes movement parallel and perpendicular to the shore.



Figure 4.3-3 - Sand and Gravel Areas

November 2003



Source: Coastal Zone Atlas 1979
p/15066.01 Burien_Crit_Comp/Graphics/Figures/FinalPOFs/Figure433.pdf

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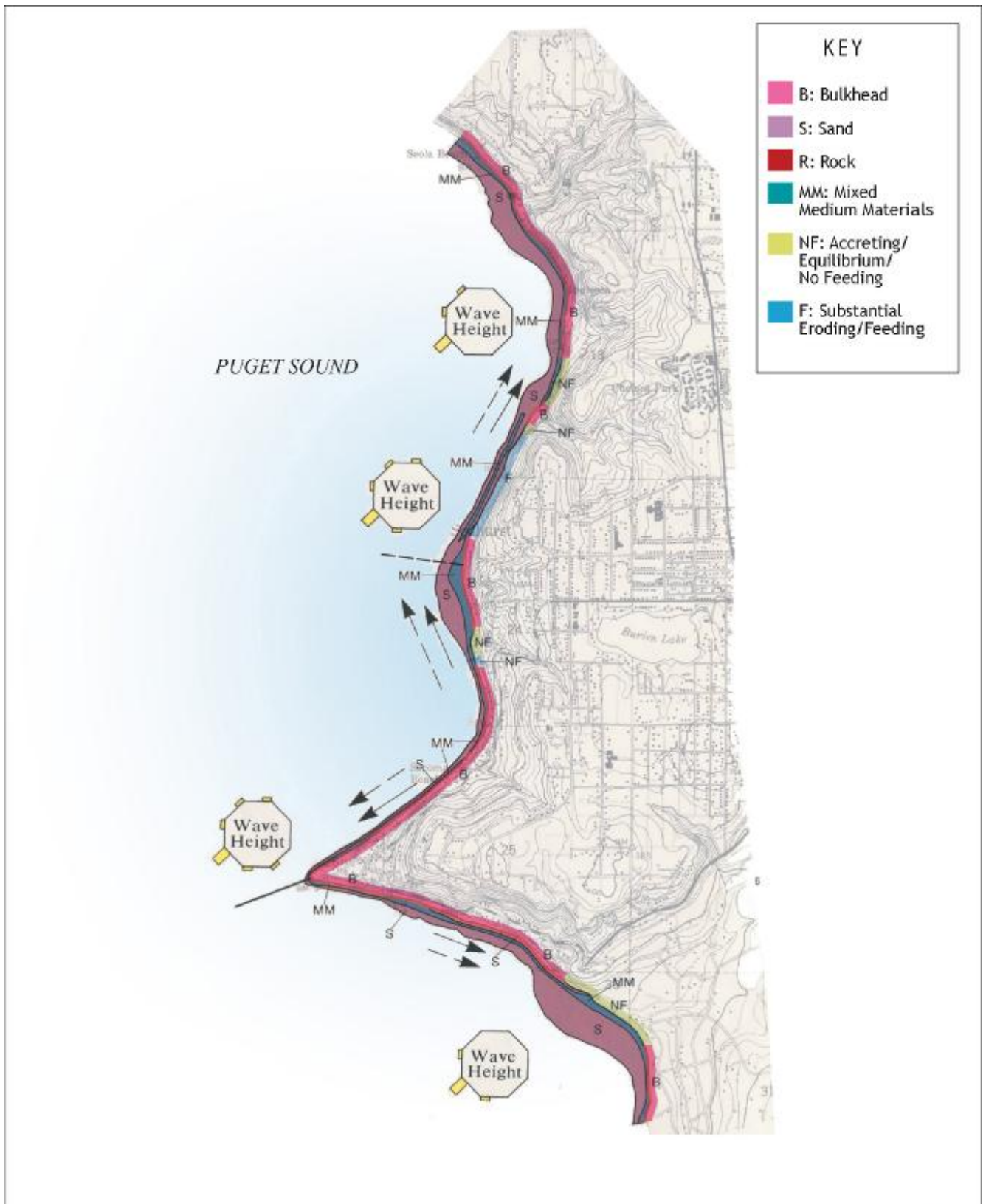


Figure 4.3-4 - Coastal Drift

Source: Coastal Zone Atlas 1979
p11e066.01: Burien_Crit_Comp/Graphics/Figures/FinalPDFs/Figure434.pdf

September 2003

Back of Figure 4.3-4

sector contains its own sources of sediment. Within the City's drift sectors, most of the shoreline is bulkheaded in an attempt to protect the shoreline from erosion, therefore there are few sources of sediments. The exception is along the coastline in Seahurst Park, where erosion of the land can take place to "feed" the sector. The greater the erosion potential of the feed source, the more sediment it will contribute to the drift. Overall, the amount of materials remains rather constant in a given sector, moving onshore, offshore or along the shore.

4.3.5 Plants and Animals

Plant Communities

The City of Burien is part of an urbanized region which has been subject to a variety of disturbances including roadway construction, residential development, commercial development and parking lot construction, public facilities, and aircraft overflight impacts. The landscape is a mosaic of natural and disturbed habitats, including wooded areas, wetlands, pastures and urban development. Few areas of natural vegetation remain outside of areas which are already protected from development, such as Seahurst Park. Existing vegetation consists of ornamental plants associated with residential and commercial uses. Other vegetation includes mixtures of trees, plants, shrubs, and grasses within parks and other open spaces. Vegetation common to riparian environments exists along the creeks within the city. Tideland/shoreline environments exist along the shoreline of Puget Sound.

Wildlife and Habitat

The character of plant communities determines wildlife usage. Wildlife diversity is related to the structure and species diversity within the vegetative communities, the size of the stands, and the contiguity of other habitats. Wildlife depends on diverse plant communities for cover, denning, rearing, foraging and spawning. Numerous species of birds forage, nest or rear their young in the City. Mammal species expected to forage, inhabit or rear their young in the City include raccoon, red fox, bush-tail wood rat, mouse, muskrat, bats and western grey squirrel. Wetlands and riparian forest communities along Miller and Salmon Creeks provide habitat for reptiles and amphibians such as frogs, turtles, garter snakes, lizards, and salamanders. Riparian corridors include a mixture of red alder and cottonwood trees, and red alderberry, willow hardhack, salmonberry and Himalayan Blackberry shrubs.

The Washington State Department of Fish and Wildlife (WSDFW) designates priority habitats and species for the state. Priority species require protective measures for their perpetuation due to their population status, sensitivity to habitat alteration, and/or commercial, recreation or tribal importance. Priority species include all state endangered, threatened, sensitive and candidate species; animal aggregations considered valuable; and those species of recreational, commercial or tribal importance that are also vulnerable.

The Central Puget Sound region is home to several threatened or endangered species of plants, habitats and animals. Threatened or sensitive plants in the region are the white-top aster, the tall bugbane, and the choriso bog-orchid. Sensitive habitats include riparian

and coastal wetlands. Threatened or sensitive wildlife in the region include the great blue heron, the green back heron, bald eagle, snowy owl, western bluebird, purple martin, western pond turtle, common loon, northern goshawk and pileated woodpecker. The WSDFW has located a number of priority species within the City of Burien. These species include bald eagles, pileated woodpeckers and great blue herons.

Most streams that drain to Puget Sound support, or previously supported, anadromous fish stocks. Culverts and other man-made stream modifications limit fish mobility to streams or to streams reaches traditionally accessed by the fish. The WSDFW has designated Miller Creek as having anadromous fish runs to the point where the Creek re-enters Burien city limits at SW 164th Place and 1st Avenue South. Historically, Salmon Creek has also supported anadromous fish habitat.

The Washington State *Coastal Zone Atlas* for the Puget Sound identifies marine resources. The *Atlas* indicates the presence of known major geoduck beds along the City's Puget Sound shoreline.

4.3.6 Air Quality

The City of Burien is located southwest of Seattle within the Puget Sound metropolitan area, a region experiencing rapid population and economic growth as well as increased traffic congestion. The city contains a mixture of urban and lower intensity land uses, and lies immediately to the west of Sea-Tac Airport.

Burien's ambient air quality levels, like other urbanized area communities, are a function of emissions produced by motor vehicles, commercial and industrial operations and various other local and regional sources. The "other" category includes sources ranging from gasoline stations, autobody paint shops and residential heating devices to Sea-Tac airport-related emissions associated with ground traffic and aircraft operations and maintenance activities.

Except for occasional, and generally short-lived, cold weather inversions and hot, stable summertime periods, the region's changeable weather conditions, combined with regulatory control strategies, help preserve good metropolitan air quality. Most neighborhood-level air pollution problems observed by or reported to Puget Sound Clean Air Agency concern dust, smoke and/or odor nuisance complaints from residents associated with incompatible, often adjacent uses. In Burien, local air quality concerns also encompass SeaTac airport operations and construction activities associated with Sea-Tac Airport facilities expansion.

Air pollution control programs in the central Puget Sound region are focused on attaining federal health-based standards established by the US Environmental Protection Agency (EPA) for: inhalable Particulate Matter (PM₁₀), Sulfur Dioxide (SO₂), Carbon Monoxide (CO), Ozone (O₃), Nitrogen Dioxide (NO₂), and Lead (Pb). The Washington State Department of Ecology (Ecology) and Puget Sound Clean Air Agency have adopted these federal standards as well.

Puget Sound Clean Air Agency is responsible for monitoring implementation of emission control strategies for carbon monoxide and ozone, updating emission control strategies and recommending control strategy revisions. While the Puget Sound region as a whole has had difficulty in the past achieving EPA standards for carbon monoxide and ozone, it is now considered an attainment area for both pollutants. EPA has approved Puget Sound Clean Air Agency's plan to maintain air quality through 2010. Burien is not situated in any of the region's three subareas currently classified as non-attainment areas for PM10.

4.3.7 Scenic Resources

Burien offers dramatic mountain, marine and urban views and vistas. Views and view corridors summarized in Table 4.3-1 below are particularly important Burien's character and identity.

Table 4.3-1 Significant Scenic Resources

Viewer Location	Direction of View	Subject of View
Many places in downtown	southeast	Mount Rainier, Cascade Mountains, Olympic Mountains, South Puget Sound/Vashon
Hilltops in the northeastern part of the City	southeast	SeaTac Airport, Mount Rainier and the Cascade Mountains
Hilltops in the Gregory Heights neighborhood	southeast	Mount Rainier and rolling foothills
Hilltops in the northeastern part of the City	west	Olympic Mountains
Bluffs and hilltops along the coastline	west and south	Mount Rainier, Puget Sound, Vashon and Bainbridge Islands, Olympic Mountains
Slopes south of Lake Burien	north	Lake Burien

4.3.8 Energy

Energy is consumed by auto and truck travel on city streets and highways. Other consumers of energy are residences, industry/businesses, and transit vehicles. Residences typically consume energy in the form of heating oil, natural gas and electricity.

Energy consumption in Burien is typical of most residential and commercial areas. Energy is supplied to homes and businesses in Burien by three principal suppliers: Seattle City Light, Puget Sound Power and Light Company and Washington Natural Gas. Homes and businesses with oil burning furnaces or wood stoves are serviced by many different suppliers of these types of energy.

4.4 ENVIRONMENTAL HEALTH

This section examines factors that affect the environmental health in Burien associated with noise.

4.4.1 Noise

Noise can be defined as annoying, disturbing, unwanted sound. Sounds are described as noise if they interfere with an activity or disturb the person hearing them. The sounds of traffic, barking dogs and aircraft, for example, are generally considered obtrusive. Most sound levels in an urban environment fluctuate with time depending on the sources of sound audible at a specific location. In addition, the degree of annoyance associated with certain sounds can vary by time of day depending on other sound sources affecting a receiver and the activities of the receiver.

Typical urban noise levels range from 30 dBA during the quietest hours of the early morning to as high as 80 dBA during the noisiest peak traffic periods. Industrial activities and traffic noise levels may exceed these peaks.

In Burien, one of the major contributors to noise is from aircraft operations at SeaTac International Airport. The extent of the noise generated by the airport may be described in terms of “noise contours” or a continuous line on a map of the airport vicinity connecting all points which have the same noise exposure level.

The eastern portion of the city is most affected by noise. A significant portion of the eastern part of the city lies within the Ldn 60 noise contour which runs north-south between 1st Avenue South and SR 509. While an annual average Ldn of 65 dBA is the Federal Aviation Administration’s (FAA) threshold for concern in residential areas, additional noise concerns are generated by the state routes that pass through the city which are located in close proximity to these east-side neighborhoods.

In other parts of the city, other sources of noise may be more obvious and replace aircraft as the major source of annoyance. These noises may include vehicle operation on highways, and arterial, collector and residential streets; construction activities; the proximity of incompatible land uses; and miscellaneous uses (i.e., barking dogs and power lawn mowers).

4.5 LAND USE AND LAND USE PATTERNS

4.5.1 Land Use Patterns

Land use patterns in Burien vary substantially from area to area (Figure 4.5-1). Retail and service uses, and to some extent multiple family uses, are concentrated in the central part of town, bounded by SR 509 to the east, the five corners area to the south, 146th on the north and the Ambaum area to the west. It should be noted that there is a significant amount of single family uses within this central core area. The land use pattern of the City is detailed in *Planning Report No. 10 - Overall Land Use Patterns* in the City of Burien.

North of the central core is a strip of regional retail and service uses extending along 1st Avenue to the northern city limits. A similar strip of uses is found along Ambaum Boulevard north of downtown. However, multiple family uses predominate in the land

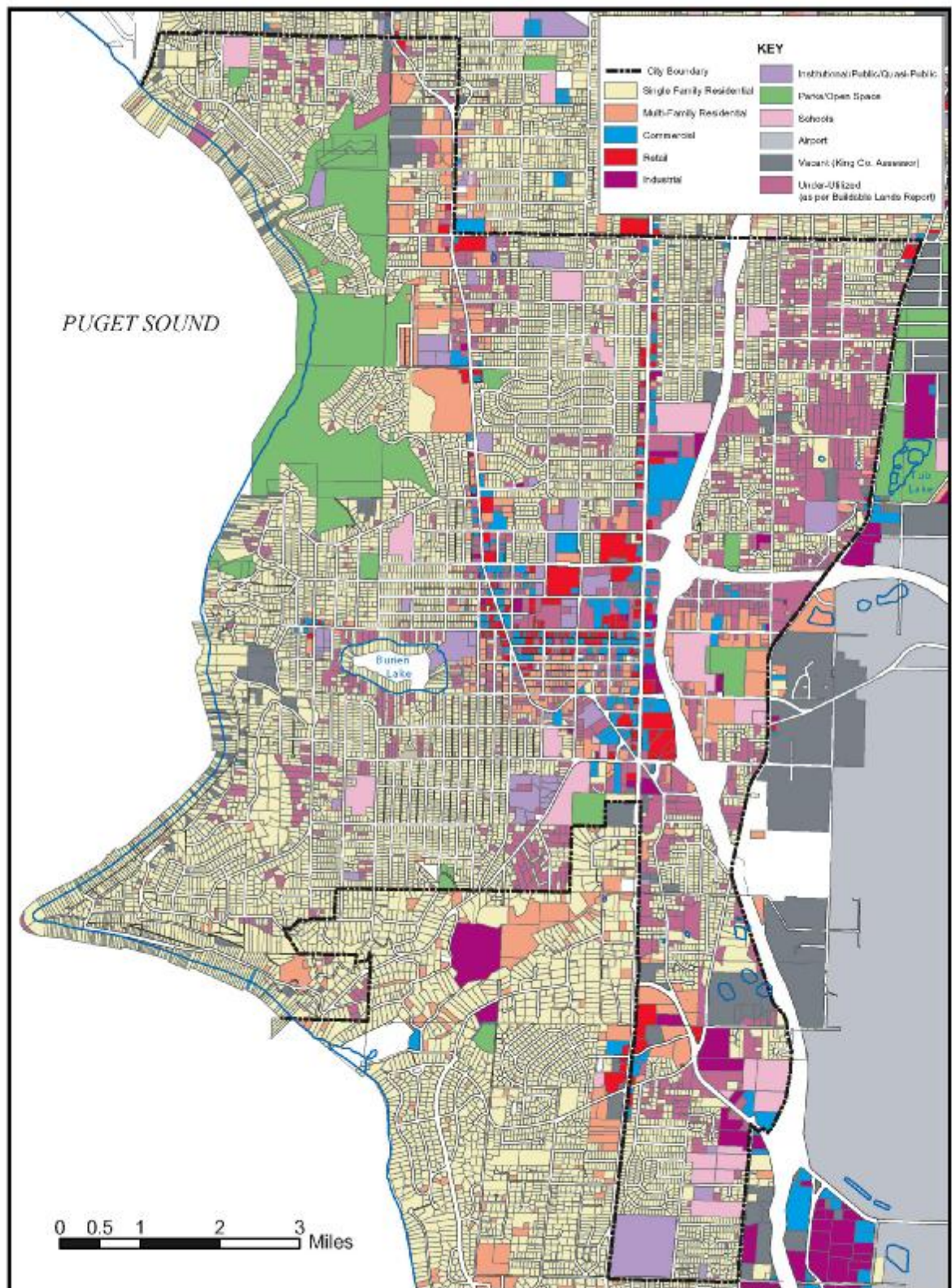


Figure 4.5-1 - Existing Land Use

November 2003



Source: King County GIS and 2002 King County Buildable Lands Report
p11e066.01 Burien_Crit_Comp/Graphics/Figures/FinalPDFs/Figure451.pdf

Back of Figure 4.5-1 Existing Land Use

use pattern along Ambaum Boulevard, with an interspersing of service uses. On the southern side of downtown there is a relatively high distribution of higher density multiple family uses. Another node of higher density multiple family uses also surrounds the high school and Moshier Park, south of SR 518 and west of 509.

Highline hospital is a significant use located in the southern part of the city. The area southeast of five corners consists of a mix of uses including a considerable amount of vacant land, the only significant concentration of industrial activities in the city, and a large amount of single family uses. The northeast corner of the city is almost entirely single family uses with some commercial uses found along Des Moines Way. Several large tracts of vacant land are present and the area generally has large lot sizes resulting in a relatively low density.

The area between SR 509 and Ambaum Boulevard north of the central business area is also predominantly single family. Along 1st Avenue and Ambaum Boulevard are strips of commercial and multiple family uses. A regional private school, Kennedy High School, is found between 1st Avenue and SR 509. Several schools and other public or quasi-public uses are also located in this area.

4.5.2 Existing Land Use

The *Coastal Zone Atlas* describes land cover and land use along the City's Puget Sound coastline. Waterward of the high water mark, land cover consists primarily of seagrass and other algal communities, as well as sand. The predominant land use landward of the high water mark is single family housing, at relatively low densities of 2 to 3 units per acre. Seahurst Park includes a large portion of the coastline and is protected from development. The large percentage of vacant parcels found in this general area consists primarily of environmentally constrained lands with steep slopes. The city has adopted the King County Shoreline Management Program to govern uses and activities along its shoreline.

The City's existing land use inventory classifies the land use of each parcel in the following generalized categories:

- Single Family Residential
- Multiple Family Residential
- Commercial Services / Office
- Retail
- Industrial
- School
- Parks / Open Space
- Institutional / Public and Quasi-Public Facilities
- Vacant lands (King County Assessor's data and 2002 King County Buildable Lands Report)

Lands classified as "Vacant" include both vacant lands identified in the 2003 King County Assessor's database and parcels inventoried by the City for the 2002 King

County Buildable Lands Report (Buildable Lands Report). The Buildable Lands Report, which identifies and evaluates the capacity for growth in King County cities, also identifies “underutilized” lands, or parcels with improvements valued below \$3,000. Therefore, a combined category of vacant and underutilized parcels as identified by the Buildable Lands Report are identified separately in Figure 4.5-1. The Buildable Lands report is regarded by the County and City as the most accurate information associated with vacant and underutilized lands.

Figure 4.5-2 summarizes the existing generalized land uses within Burien in a pie chart. As can be seen, generalized land uses include mostly single family residential use (53%) within Burien city limits. Approximately 18% of the City is within the “vacant” or underutilized category and are primarily scattered along the eastern portion of the City. The Port of Seattle has purchased a large concentration of these lands in “Special Planning Area 4” where construction of the Sea Tac International Airport 3rd Runway project is planned.

Land Use Characteristics

Table 4.5-1 summarizes the general distribution of land uses by assessed value. The distribution of land uses by value has changed significantly over the past five years. For example, single family residential areas currently hold approximately 68% of the assessed value of the community as a whole and the value per square foot has increased from \$12/sf in 1997 to \$18/sf in 2003, or an increase of 50%. In contrast, multifamily uses have declined in value over this same time period from \$21/sf in 1997 to \$16/sf in 2003, or a decrease of 23%.

The highest intensity of value per square foot is in commercial services / office uses (\$51/sf) and retail (\$28/sf). These uses comprise a smaller portion of land area within the community and are generally located downtown and adjacent to 1st Avenue. Land use characteristics can be summarized as follows:

- Most of the land in the city is used for single family residential uses: almost 53% (over 2,100 acres) of the developed (net land area - excluding right of ways) land area. Multifamily uses, including condos and townhouses, consume 7% (267 acres) of this area, while commercial services / offices, retail, and industrial uses consume another 6%. Approximately 18% (715 acres) of the net land is vacant or underutilized (land or structures) Park lands and open space comprise 9% of the City;
- Residential uses comprise almost 68% of the assessed value of the land, while commercial uses comprise approximately 19%;
- The most value intensive use of the land (measured by assessed value per square foot) is commercial services / office;
- Land values are generally significantly higher (two to three times higher) in the west part of the city and lower in the eastern portion of the city;

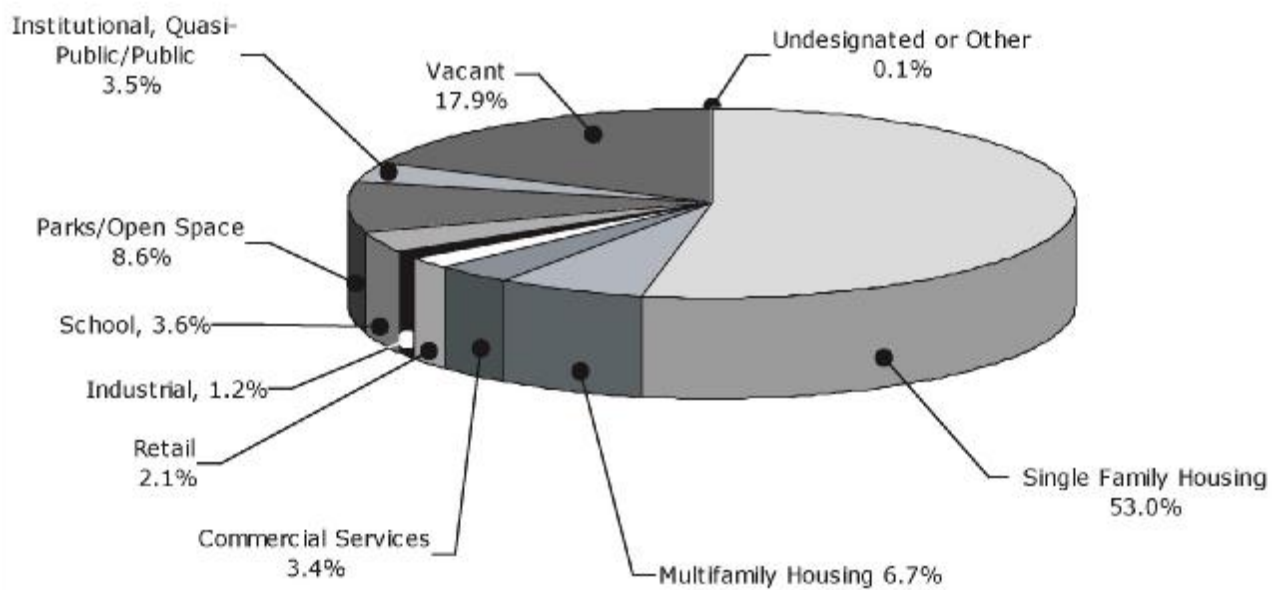


Figure 4.5-2 - Pie Chart of Existing Land Use

Source: King County GIS 2003 and 2002 King County Buildable Lands Report
 pr1e066.01: Burien_Crit_Comp/Graphics/Figures/Final/PDFs/Figure452.pdf

November 2003



Back of Figure 4.5-2 Existing Land Use Pie Chart

Table 4.5-1 Generalized Existing Land Use by Assessed Value

EXISTING LAND USE	No. of Parcels	Acres	Percent of Area	Assessed Value	Percent of Value	Value Per SF
Single Family Residential	8,547	2,119	53%	\$1,973,484,395	68.4%	\$18.01
Multifamily Residential	783	267	7%	\$254,994,000	8.8%	\$16.13
Commercial Services / Office	292	134	3%	\$380,953,300	13.2%	\$51.21
Retail	175	83	2%	\$125,883,500	4.4%	\$28.40
Industrial	47	48	1%	\$36,441,600	1.3%	\$15.46
School	26	142	4%	\$27,036,400	0.9%	\$4.34
Parks / Open Space	40	343	9%	\$20,463,100	0.7%	\$1.37
Institutional / Quasi-Public / Public Facilities	117	138	3%	\$42,526,400	1.5%	\$6.21
Vacant / Underutilized	126	715	18%	\$23,089,200	0.8%	\$3.74
Undesignated or Other	2	4	0%	\$100	0.0%	NA
Total	10,155	3,995	100%	\$2,884,871,995	100%	NA

Source: King County Assessor's Data, 2003; 2002 King County Buildable Lands Report.

- Assessed values of land and improvements in central Burien are significantly higher than citywide average value for almost all types of uses. The assessed value of land classified as vacant in central Burien is more in value than the average assessed value of land in vacant uses citywide; and
- The average single family residential lot has approximately 12,500 square feet, about a quarter of an acre.

4.5.3 Land Capacity to Accommodate Future Growth

GMPC Household and Employment Targets for Burien

The Growth Management Act (GMA), passed by the State Legislature in 1990, requires that counties and cities develop a collaborative set of framework policies, now known as the Countywide Planning Policies (CPPs), to guide development of each jurisdiction's comprehensive plan. In 1994, the CPPs were amended to include household and employment targets (or goals) for each jurisdiction to meet in a 20-year planning period. The intent of the targets is to provide a regional framework for local plans on the accommodation of new households and to demonstrate a commitment to accommodate growth in adopted Urban Growth Areas (UGA).

The concept of 20-year jurisdictional targets was a local response to the broad direction in the GMA and to stakeholder concerns regarding capacity and planning. In response to the GMA requirement that local plans accommodate a countywide, 20-year population

estimate from the State OFM, each city reached agreement on the amount of growth that reflected its own community's vision. Generally, cities with urban centers volunteered for proportionately larger numbers reflective of the desire to develop centers over time. These targets relate to a GMA directive to jurisdictions to accommodate anticipated growth through appropriate planning, zoning and infrastructure strategies.

King County's Growth Management Planning Council (GMPC) is a formal council comprised of elected officials from King County, municipalities, and special purpose districts that collaborate to distribute growth targets for municipalities within King County. Under agreements with the GMPC, the City of Burien is responsible for a household target of an additional 1,552 households and 450 jobs by 2022. In 2000, the City of Burien, with help of the Suburban Cities Association of King County, prepared a development capacity analysis to demonstrate the City's ability to accommodate future population and employment growth over the next 20 years.

The following sections summarize the results of the Buildable Lands Report and the existing land capacity within the City. Because the King County Assessor's data discussed in the previous sections accounts for and designates lands in a somewhat different manner than the Buildable Lands Report for different purposes, data in the following sections may not correspond with the generalized existing land use data. The following sections provide the best available land use data and development capacity.

Residential Lands

According to the Buildable Lands Report, 315 net new units were built in the area now comprised of the City of Burien during the eight-year period between 1993 and 2000. The majority of new units (77%) were built during the later half of this period.

Permit activity between the years of 1996 and 2000 indicated that the average density achieved in single family zone, during the past five years was 4.8 dwelling units per acre. Plat activity indicated an achieved density of 5.2 du /acre in single family zones, whereas multifamily zones achieved an average density of 15.2 du/acre.

According to the Buildable Lands Report, Burien has approximately 406 net acres of vacant and underutilized land after deducting constraints contained within zones that allow residential development. It should be noted that the developable lands study recognized underutilized land as a potential source of developable land. With an adjustment for market variables, about 352 total acres of this land is potentially available for development/ redevelopment during the planning period. In single family zones, market factor deductions ranged by zone. After all deductions there are 289 acres in single family zones and 52 acres in multifamily zones potentially available for development. There are also approximately 10 acres developable for residential use in mixed-use zones. Vacant lands owned by the Port of Seattle were not included in this analysis. Deductions and market factor adjustments for mixed-use land were made before apportioning it to residential and commercial uses.

Residential Capacity

According to the Buildable Lands Report, Burien has capacity for approximately 2,178 new housing units within its current land supply where residential development is permitted by zoning. Approximately 1,020 of these housing units could be located within single family zones, 686 units could be located within multifamily zones, and 473 units could be located within mixed-use zones by the year 2022.

Table 4.5-2 provides a summary of residential land capacity in relation to the GMPC housing target. Burien has a total residential capacity of 2,178 units. Its remaining target to 2012 is 1,552 units. This results in a residential capacity surplus of about 626 units. Approximately 17% of Burien's target was achieved during in the first eight years of the original twenty-year planning period, which was extended to 2022.

Table 4.5-2 Residential Land Capacity in Relation to Burien Housing Target

Net New Units: 1993 – 2000	20 Year Housing Target	Percent Achieved	Remaining Target	Current Capacity	Surplus or Deficit of Capacity
315	1,867	17%	1,552	2,178	626

Source: King County Buildable Lands Report 2002

Commercial and Industrial Lands

Since its incorporation in 1993, the City of Burien has generated 503 net new jobs during the first eight years of the planning period. According to the 2002 King County Buildable Lands Report, employment in Burien has reached approximately 11,803 jobs. Burien also achieved an average floor area ratio (FAR) of approximately 0.32 over all its commercial zones and an F.A.R. of 0.34 in its industrial zone.

After deducting constrained lands such as critical areas, the Buildable Lands Report states that Burien contained approximately 113 net acres of vacant and underutilized lands zoned for commercial, industrial, mixed uses. After adjusting for market factors, approximately 100 acres are potentially available for development. An additional 10 acres could support commercial development in mixed-use zones. (Deductions and market factor adjustments for mixed-use land were made before apportioning it to residential and commercial uses.)

Commercial and Industrial Capacity

Table 4.5-3 provides a summary of the capacity of each commercial and industrial zone that could provide employment opportunities when developed / redeveloped. A summary of the net square footage, FAR, net and gross development capacity, and FAR per employee is also summarized. The Downtown Commercial (DC) and Commercial (C) zones provide the majority job capacity. It should be noted that Special Planning Area 4 was not yet defined when this analysis was conducted. Therefore, employment capacity for this area was accounted for in the preexisting industrial zoning.

In total, Burien has capacity for a total of approximately 2,963 new jobs within the City (Table 4.5-3). Approximately 1,648 of those employees could work in commercial zones and 965 employees could work in mixed-use zoned areas. There is also capacity for an

Table 4.5-3 Commercial and Industrial Employment Capacity

EMPLOYMENT CAPACITY	Commercial Zone / Planning Area								Total
	CI	CN	CR	CC-1, CC-2	O	SPA-1, SPA-2, SPA-3	DC	I	
Net Land in SF	408,031	34,275	860,946	984,126	211,920	297,841	450,638	1,100,325	4,348,102
Achieved / Assumed F.A.R.	0.25	0.32	0.32	0.32	0.45	0.32	1.00	0.34	NA
Development Capacity in SF	102,008	10,968	275,503	314,920	95,364	95,309	450,638	374,111	1,718,820
Net Capacity in SF	57,792	9,634	180,833	238,504	95,364	64,098	289,603	347,900	1,283,727
Floor Area Per Employee	450	450	500	400	250	400	300	1,000	2,963
Employment Capacity (jobs)	128	21	362	596	381	160	965	348	2,963

Note: SPA-4 not defined at time of Buildable Lands Report; employment capacity in SPA 4 is assumed within preexisting zones.

Source: King County Buildable Lands Report 2002

Table 4.5-4 Burien Employment Capacity in Relation to Target

Net New Jobs	20 yr. Job Target	Percent of Target Achieved in 8 Yrs.	Remaining Job Target	Job Capacity	Surplus or Deficit of Capacity
503	450	112%	(53)	2,963	3,016

Source: King County Buildable Lands Report 2002

additional 348 jobs in industrial zoned areas. Table 4.5-4 provides a summary of the overall employment capacity within Burien.

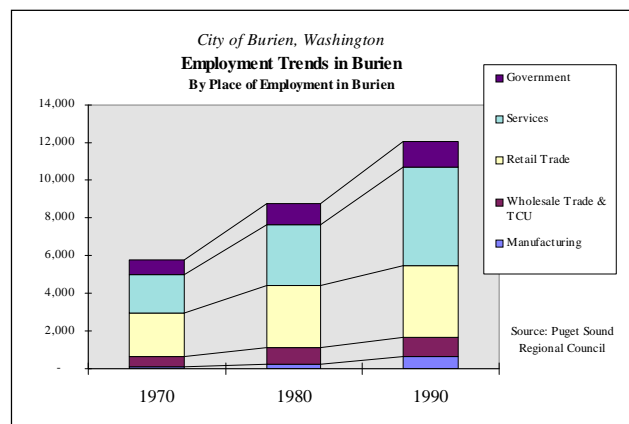
In total, Burien has capacity for 2,963 new jobs by 2022, which significantly exceeds Burien's job target of 450 employees. During the first eight years of this period, the City added 503 new jobs achieving 112% of its target, or 53 more jobs than planned. As a result, the City has a surplus capacity of 3,016 jobs over its target for the twenty-year period.

4.6 EMPLOYMENT

Employment patterns can be measured on the basis of where the employees reside or where they work. The total number of employees in Burien, counted in either fashion, is very similar.

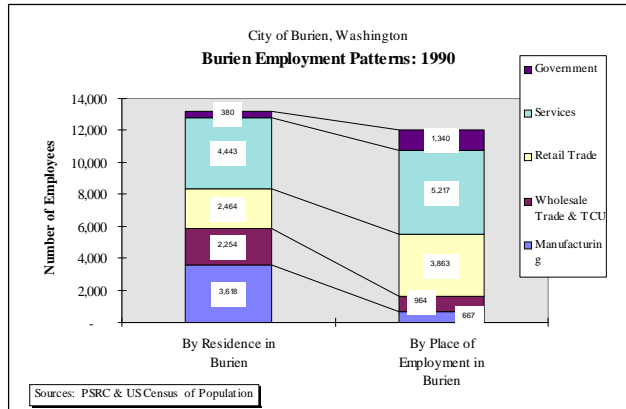
4.6.1 Employment Trends, 1980 – 2000

All the sectors grew significantly over the period. Between 1980 and 1990 the fastest growing sector was actually manufacturing, growing by 417 jobs, or 166%. While manufacturing was the fastest growing, the largest growing

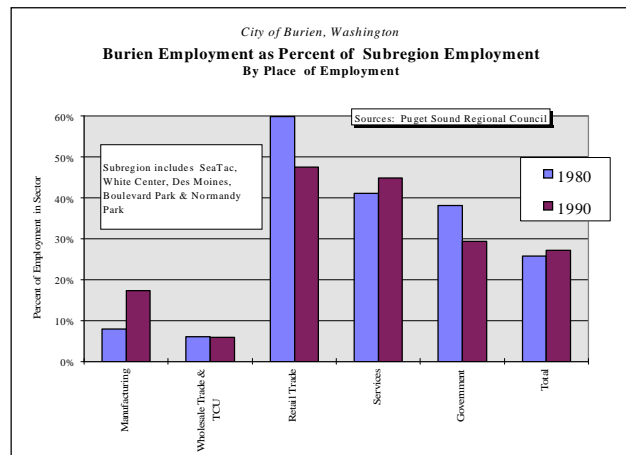


sector was the service sector, which added over 2,000 jobs, almost 64% growth over the 1980's. Retail trade also saw an additional 535 jobs. Total employment in the city grew from 8,792 in 1980 to over 12,000 jobs in 1990. In 1970 Burien had only 5,700 jobs.

In 1990 the US Census of Population counted 13,159 employed people residing in the City of Burien, while the PSRC estimated the number to be 12,051. While the total numbers were similar, there was substantial variation between the sectors. While 27% of the people who resided in Burien earned their livelihood from manufacturing, the city had only 667 people employed within its boundaries in this sector. A similar contrast existed in the wholesale and trade sectors. While over 2,200 people who worked in this sector resided in Burien, only 964 jobs actually existed in this sector within the city. The pattern was reversed for other sectors. While over 2,400 people living in Burien worked in retail trade, the city had over 3,800 jobs. Similarly, in services, 4,400 people lived within the city while 5,200 people worked here. And, while the trade and services sectors dominate the role of Burien as an economic center, the residential character of the city is much more manufacturing and wholesale trade oriented.



Burien plays an important role in the economy of the area surrounding the city. In 1990, approximately 21% of the total jobs in this economic subregion were found in the City of Burien. While SeaTac generally dominated the total economy, with 28,000 jobs (almost 51% of the total employment of the subregion), the City of Burien's role has increased modestly over the last decade increasing from 20.5% of the employment to 21.3%.

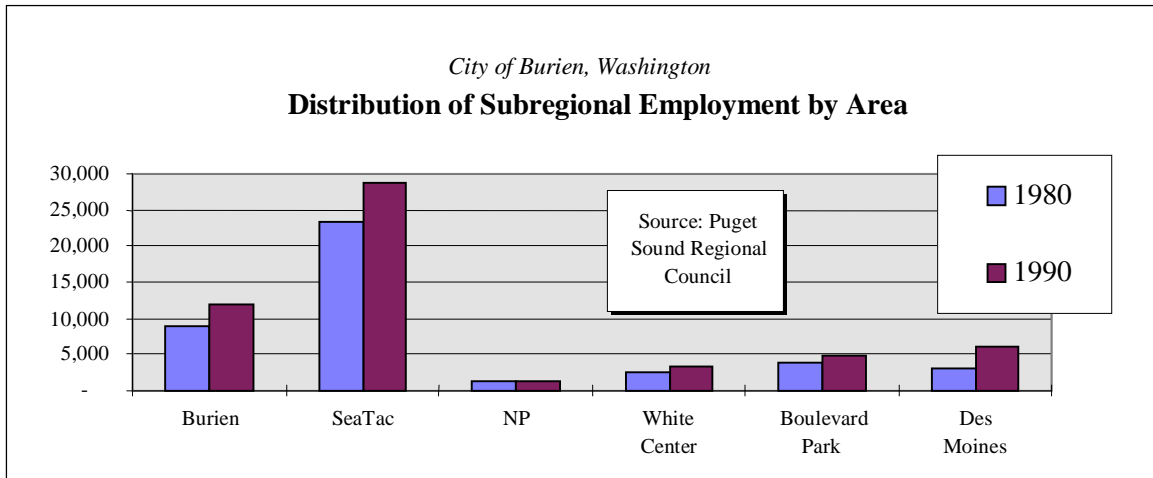


Significantly, SeaTac's share of total employment declined from 54% to 51%. The Des Moines area increased from 7% to 11%.

While the city's share of total subregional employment increased slightly, Burien had very significant gains in its share of manufacturing and services employment. Since 1980 the City lost a substantial amount of its share of retail employment, declining from just under 60% in 1980 to well under 50% of total retail employment in the subregion in 1990.

4.6.2 Existing Employment

The City of Burien has fewer residents working in management and professional occupations than other occupations (Table 4.6-1). The majority of residents work in sales and services which traditionally are lower wage jobs. This is similar to the surrounding communities, except for Normandy Park.



All of the surrounding communities have a higher percentage of workers in the construction and maintenance and the production and transportation fields which may reflect the concentration of certain employers located in the South end, such as Seattle-Tacoma airport and Boeing.

4.6.3 Major Employers in Burien

Table 4.6-2 represents the largest employers in the City of Burien based on number of full-time (FTE) and part-time (PTE) employees.

4.7 HOUSING

The following section on housing needs and conditions in the City of Burien is based on information from the *Planning Report No. 13 - Characteristics of Housing in Burien* and the *2003 Demographics Report* prepared by the City of Burien.

4.7.1 Overview

The following provides an overview of the general housing condition in the City of Burien:

- Burien has a similar proportion of single family and multifamily housing in comparison with King County. In 2000, 59% of the housing units in Burien were single-family residences, compared to the County average of 60%. The majority of the remaining units are multifamily, with a small percentage of mobile homes and trailers. Des Moines also contains a similar proportion of housing types.

Table 4.6-1 Percent of Workers by Occupation

2000	King County	Burien	White Center CDP	Boulevard Park CDP	Normandy Park	SeaTac	Des Moines	Tukwila	Seattle	State
Workers by Occupation										
Management & Professional	43%	30%	25%	22%	48%	21%	32%	27%	48%	36%
Service and Sales	39%	44%	45%	44%	36%	46%	44%	46%	38%	41%
Construction & Maintenance, Production & Transportation	17%	26%	30%	34%	16%	32%	23%	26%	13%	22%
Farm	0%	0%	1%	0%	N/A	0%	0%	0%	0%	2%
1990 Workers by Occupation										
Management & Professional	38%	28%	24%	26%	47%	23%	30%	28%	41%	32%
Service and Sales	41%	45%	43%	41%	39%	45%	44%	44%	41%	40%
Construction & Maintenance, Production & Transportation	20%	26%	31%	32%	12%	31%	26%	27%	17%	25%
Farm	1%	1%	2%	1%	2%	1%	1%	1%	1%	3%
1990 to 2000 Change in Workers by Occupation										
Management & Professional	14%	7%	4%	-16%	3%	-8%	8%	-3%	18%	12%
Service and Sales	-3%	-2%	3%	9%	-9%	3%	1%	6%	-7%	2%
Construction & Maintenance, Production & Transportation	-15%	-1%	-3%	5%	27%	3%	-9%	-1%	-22%	-11%
Farm	-77%	-50%	-62%	-77%	N/A	-57%	-85%	-88%	-75%	-54%

Table 4.6-2 Major Employers in Burien

Employer	FTE	PTE
Azteca Restaurant	70	10
BBC Dodge	78	5
Burien Terrace	140	10
Burien Toyota	86	4
Fred Meyer	90	135
Glen Grant Chevrolet	67	0
Group Health Cooperative	88	4
Highline Care Center	50	25
Highline Community Hospital	1100	0
Highline School District #401	2300	NA
Millennium Ford	75	1
Puget Sound ESD	160	25
Wizards Restaurant	200	0

Source: City of Burien 2003.

White Center and SeaTac have a smaller percentage of single family units (54%). Boulevard Park (72%) and Normandy Park (82%) have a higher percentage.

- Burien has a higher percentage of very large multi-family units than King County. In 2000, 19% of the Burien housing units were located in multi-family sites of 20 or more units. This is higher than the 16% county average and only Seattle has a higher rate of 24%.
- The majority of Burien residents own their home. In 2000, 56% of Burien housing was occupied by the owner. This is slightly below the County average of 60%, but is similar to the rest of South Central King County.
- Fewer Burien residents have a mortgage relative to the County. In 2000, 65% of Burien residents who owned their residence had a mortgage. This is substantially below the County average of 78% of owners with a mortgage. This may reflect the older and more stable population which has remained in the same house for a longer period of time who has been able to pay off a mortgage.
- Many Burien residents spend a substantial amount of their income on housing. In 2000, 1 out of 3 Burien residents (32%) spent more than 35% of their income on housing. This was the same for owners and renters. This is higher than the County average of 25% for owners and 30% of renters who spend more than 35% of the income on housing. The most significant increase was for owners in Burien as compared to 1990 and most likely reflects the increased cost of housing in that period.
- Burien does not have many public housing projects in comparison to nearby communities. Currently there are two projects, Yardly Arms and Munro Manor which provide housing for the elderly and disabled. The recent addition of Lora Lake has added more supply of below market rents, but it is privately managed.
- A significant portion of Section 8 housing is in South King County. According to the King County Housing Authority, 27% of section 8 housing vouchers are redeemed in the communities from White Center to Tukwila, including Burien. In Burien, most of the Section 8 housing vouchers are used in residences south of 148th.

In comparison to other King County cities with at least 500 rental units, the City of Burien ranks in the following categories:

- Burien ranks 5th highest percentage of persons paying gross rent that exceeds 30% of household income (40.6%);
- Burien ranks 6th highest percentage of persons paying gross rent that exceeds 35% of household income (32.2%);
- Burien ranks 5th highest in percent of housing units 40 years and older (46.2%) and is highest among South King County cities; and

- Burien ranks 7th highest in percent of housing units 30 years and older (65.2%) and is second highest among South King County cities.

The last item of note is associated with affordable housing. Using gross rent as percent of income, Burien's rental housing stock is less affordable than places such as Bellevue, Mercer Island, Kirkland, Redmond, Issaquah and Bothell. This issue is one of Burien's most significant challenges to improving quality of life in the City.

4.7.2 Housing Trends, 1980-2000

According to the *Planning Report No. 13 - Characteristics of Housing in Burien*, the composition of Burien's housing stock changed substantially between 1980 and 1990. In 1980, approximately 74% of the homes were single family and 26% multifamily. By 1990, approximately 65% of the dwelling units were single family homes, 33% multifamily units, and 2% other types of homes, including manufactured housing such as trailers and mobile homes.

Between 1980 and 1990 the majority of net new housing units in the Burien community were in multifamily units. However, in the early part of the 1990s through 1980, the number of net new multifamily units was on the decline.

In general, Burien has had a higher percentage of single family homes, with the exception of Normandy Park, than neighboring areas. Burien also has had a similar amount of multifamily units as SeaTac and less multifamily than Tukwila and Des Moines.

In comparison to other communities in the region between the 1980s and 1990s, Burien had a fairly even balance between the number of owner and renter occupied homes, with just over 50% of owner-occupied households. Burien's household tenure ratio was most similar to the City of Seattle at that time. Normandy Park had significantly more owner occupied than renter occupied units. Conversely, Tukwila had almost twice as many renter occupied units as owner occupied.

In 1993, the average sales price for a single family home in Burien (approximately \$140,000) was greater than some of the communities surrounding the City, including SeaTac, Tukwila, and White Center. Sales price for a single family home in Burien was most similar to Des Moines. In recent years after 1993, Burien's average sales price stayed about the same, where almost all of the other communities experienced an increase.

Rents for a 2-bedroom apartment during this period were compared between neighboring cities. Rents in the south King County area varied between approximately \$500 and \$575, with Burien being one of the most affordable places to rent. Similar to single family housing sales prices, Burien was one of the only communities to experience a decline in apartment rents recently thereafter.

In the early 1990s, the majority of homes in Burien were considered affordable for those households making at least the median household income. This was not the case,

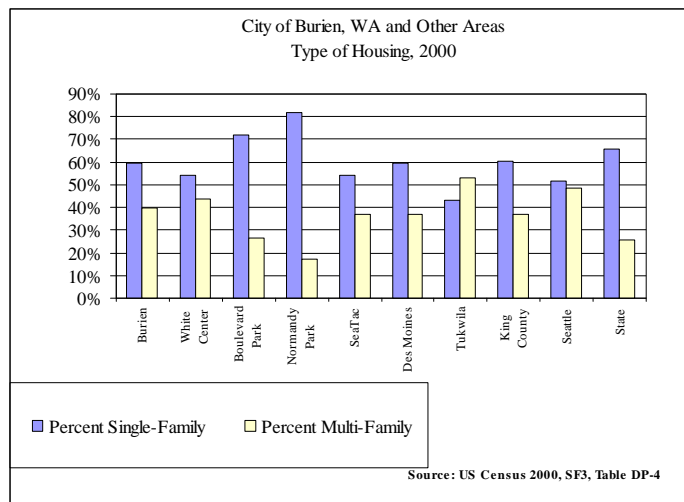
however, in Census Tracts 276 and 278 (see Figure 4.2-2 in the Population Characteristics section), where the homes were priced significantly higher (\$14,000 to \$67,000) than what was considered affordable for these income levels. Low-income households during this period had a more difficult time finding an affordable home in Burien.

4.7.3 Existing Housing Conditions

Since the 1980s and 90s, some housing conditions, such as type and supply of housing, have changed very little. Other housing conditions, such as affordability and age, have changed somewhat more. The following sections provide an overview of the existing housing condition in Burien as described in the *2003 Demographic Report* prepared by the City. Table 4.7-1 provides a summary of housing statistics used in discussion under the following sections.

Housing Types

Burien's percentage of single-family residences is very similar to the County average and has not changed significantly since 1990. Burien does not have a disproportionate percentage of multifamily units in comparison to the King County average. However, Burien does have a higher percentage of very large multifamily complexes, which have more than 20 units, than the County average.



Burien reflects the County average for housing types whereas White Center and Tukwila have a significantly higher percentage of multifamily units than Burien.

Stability of Residences

Burien has a very stable population; more than 38% of the current residents have lived in the same place for more than 10 years and more than 52% have lived in the same place for more than 5 years. This data reflects the older than average age of people in our community.

Owner vs. Renter

According to the *2003 Demographic Report*, home ownership increased in Burien in the last ten years from 50% owners in 1990 to 56% owners in 2000. This ownership increase is similar to the statewide average, although below the average change in the surrounding communities.

Table 4.7-1 Summary of Housing Statistics, 2000

HOUSING STATISTICS	Burien		S. Central King Co.		King County		Seattle		State	
	2000	%	2000	%	2000	%	2000	%	2000	%
Total Housing Units	14,024	100%	87,244	100%	742,237	100%	270,536	100%	2,451,075	100%
Occupied housing units	13,399	100%	83,503	1	710,916	100%	258,499	100	2,271,398	100
% Owner-occupied housing units	7,552	56%	45,940	55%	425,436	60%	125,165	48%	1,467,009	64%
% Renter-occupied housing units	5,847	44%	37,563	45%	285,480	40%	133,334	52%	804,389	35%
Housing Types										
1 unit, detached	8,114	58%	46,983	54%	423,328	57%	132,908	49%	1,527,867	62%
1 unit, attached	187	1%	3,018	3%	23,838	3%	5,919	2%	75,807	3%
2 units	103	1%	1,594	2%	15,831	2%	9,684	4%	68,836	3%
3 or 4 units	506	4%	3,968	5%	31,428	4%	12,178	5%	92,243	4%
5 to 9 units	1,188	9%	6,381	7%	49,573	7%	18,935	7%	112,031	5%
10 to 19 units	1,147	8%	7,124	8%	57,782	8%	23,852	9%	125,087	5%
20 or more units	2,593	18.5%	15,411	17.7%	120,380	16%	65,699	24.3%	228,720	9.3%
Mobile home	169	1%	2,552	3%	18,539	3%	581	0%	207,861	9%
Year Moved Into Unit										
% moved in prior to 1980	24%		17%		15%		15%		15%	
% moved in between 1980 and 1995	29%		27%		30%		27%		31%	
Mortgage Status										
% of owners with a mortgage	65%		73%		78%		72%		75%	

Source: 2003 Demographic Report

Housing Affordability

According to the U.S. Department of Housing and Urban Development (HUD), a home is considered affordable when the total housing costs do not exceed more than 30% of the household income. For rental units, this would include rent and utilities. For ownership units, the total cost includes mortgage, insurance, and homeowners dues, if any.

Qualification for most affordability programs is determined by a formula that is based on the King County Median Income. Table 4.7-2, below, describes the King County Median Income for the year 2002:

Housing affordable to a family earning \$100,000 a year is very different than housing affordable to a family with a yearly income of \$30,000. Housing affordability is measured in terms of household income as a percentage of the County's median household income. The King County median income is broken down into four income groups:

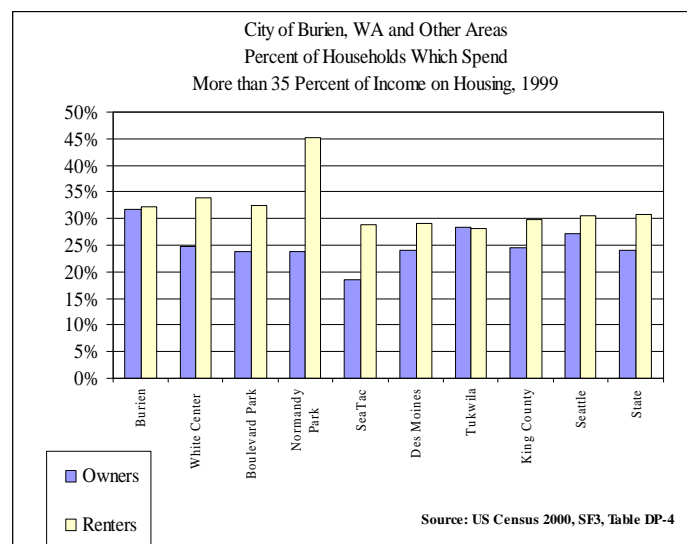
Table 4.7-2 2002 King County Median Income

2002 King County Median Income	1-Person	2-Person	3-Person	4-Person	5-Person	6-Person
100% of Median Income	\$55,230	\$63,120	\$71,010	\$77,900	\$85,212	\$91,524
80% Median Income	\$44,184	\$50,496	\$56,808	\$63,120	\$68,170	\$73,219
50% Median Income	\$27,615	\$31,560	\$35,505	\$39,450	\$42,606	\$45,762

Source: <http://www.archhousing.org>

- Low Income Households: Households making up to 50% of the King County median income;
- Moderate Income Households: Households with incomes between 50% and 80% of median income;
- Median Income Households: Households at 80% to 100% of median income; and
- Above Median Income Households: Households making above 100% of median income.

Since Burien is a part of the regional housing market it is useful to examine housing affordability from a regional perspective. Table 4.7-3 provides a summary of the percentage of householders in Burien that pay over 35% of income on housing costs. Even though Burien has much less expensive housing in comparison to other areas in the County, more home owners and renters are paying a higher percentage of their income on this housing. One out of three homeowners are spending more than 35 of their income on housing. The most significant change was for owners which tripled in the past ten years.



Housing Stock Conditions

In general, the majority of Burien's housing stock (almost 75%) was built between 1939 and 1980. In Burien, the majority of older housing stock has been well-maintained, although there is some concern regarding a smaller percentage of homes and multifamily units that are slowly deteriorating over time. In each of the City's census tracts, over 75% of the housing stock was categorized in "good" condition. The number of units classified as "poor" is very low (*Planning Report No. 13 - Characteristics of Housing in Burien*).

Table 4.7-3 Renters / Owners that Spend Over 35% of Income on Housing

Housing Affordability	King County	Burien	White Center CDP	Blvd Park CDP	Norm. Park	SeaTac	Des Moines	Tukwila	Seattle	State
Percent of Owners who spend more than 35% of income on housing										
2000	25%	32%	25%	24%	24%	19%	24%	28%	27%	24%
1990	11%	10%	10%	6%	8%	7%	8%	9%	11%	11%
Percent Change	120%	214%	145%	310%	183%	163%	194%	227%	138%	126 %
Percent of Renters who spend more than 35% of income on housing										
2000	30%	32%	34%	32%	45%	29%	29%	28%	31%	31%
1990	29%	26%	35%	28%	23%	24%	27%	21%	31%	29%
Percent Change	3%	26%	-3%	16%	96%	19%	10%	36%	-2%	6%

Source: 2003 Demographics Report.

Public Housing Assistance

King County Housing Authority (KCHA) is located in Tukwila and serves all county residents that need housing assistance, with the exception of Seattle and Renton residents that have their own housing authorities.

Currently, two public housing developments exist within the City including the Yardly Arms and Munro Manor complexes. Approximately 126 households live within both of these developments and the majority is very low income, living on an average of under \$9,000 annually. Approximately half of these residents are elderly.

In total, the KCHA has provided approximately 7,700 Section 8 housing vouchers to County households in need. Approximately 27% of these (2,067) are directed towards households in the Highline area.

The waiting list for KCHA programs is as high as the current enrollees with 4,000 households on the waiting list for public housing and 7,000 household on the waiting list for section 8 housing. A majority of the section 8 vouchers used with Burien city limits are redeemed for housing near Lake Burien and south of 148th.

There are also more units of housing through Bond Financing and Tax Credits than in the typical public housing. These units are run at rates just below market and the Tax Credit projects are run by private companies.

KCHA is currently exploring partnerships with the City of Burien that may include a demonstration project with the goal of sparking reinvestment in the area.

4.8 TRANSPORTATION

This section identifies the existing transportation systems as identified in the City of Burien 2003 Transportation Study. The study was prepared on behalf of the City and establishes strategies and programs to implement the City's transportation goals and policies identified in Chapter 2 of the Burien Plan.

4.8.1 Inventory of Existing Transportation System

The transportation system for the City of Burien includes streets and highways, pedestrian and bicycle facilities, multi-modal facilities, and transit and paratransit service. The primary study area for this evaluation includes significant roadways, including all arterials and collectors, within the existing City boundaries. Some local roadways that provide access and circulation within various parts of the City was also included. The City of Burien, neighboring cities, King County (including Metro), and the Washington State Department of Transportation (WSDOT) in conjunction with the Puget Sound Regional Council (PSRC) intend to work cooperatively to regulate land use and coordinate transportation system improvements. The goal is to provide consistency with the planning efforts of all jurisdictions within the planning area. Therefore, the transportation planning area includes all of the City of Burien and adjacent unincorporated areas. Portions of neighboring cities and their key transportation facilities are also included as part of the transportation planning area. The transportation planning model developed to forecast future transportation conditions included a significantly larger area to assure consistency in planning within the study area. Traffic forecasts and modeling conducted as part of the 2003 Transportation Study is on file with the City of Burien's Public Works Department.

Roadway Functional Classification

The functional classification system used by city, state, and federal transportation agencies provides for a hierarchy of roadways within the public street system. The system classifies facilities based on the desired function of the roadway to accommodate through-traffic movement, access to adjacent properties, or combination of these functions. The functional classifications are used to establish eligibility for roadway funding projects and to define appropriate street design standards and traffic operating characteristics.

In 2003, the classification of several roadways were revised from classifications assigned in 1993 when the City was first incorporated. The revisions were based on the City's desired function of the roadways, especially in the relationship between movement of through traffic versus property access. Functional classifications definitions are provided in Table 4.8-1. Figure 4.8-1 depicts the City's functional classification plan. City design standards require that all arterials "shall accommodate pedestrian and bicycle movement, as well as automobile and transit traffic."

Roadway System and Traffic Controls

Figure 4.8-2 depicts the existing arterial roadway and freeway system serving the City of Burien and adjacent communities in the planning area. It also shows the existing traffic controls for intersections. The following summarizes features of the significant roadways that comprise Burien's transportation system. As a general naming convention, roadways west of 1st Avenue S have a SW designation (e.g., SW 128th Street), while east of 1st Avenue S, the roadway changes to a S designation (e.g., S 128th Street).

Back of Figure 4.8-1 Roadway Functional Classification

Back of Figure 4.8-2 Number of Lanes by Direction

Table 4.8-1 Functional Classification Definitions

Classification	Definition
Freeway/Expressway	Inter-regional divided highways connecting major centers. Typically, freeways have two or more lanes for traffic in each direction; access is limited to interchanges designed for higher speed merging/diverging traffic.
Principal Arterial	The City street standards for principal arterials shall accommodate through traffic on these roadways that connect community centers or major transportation facilities. Principal arterials have heavy through traffic volumes, are suitable for express and local transit service and should be designed to accommodate through truck traffic. Curb cuts to provide access to abutting property should be minimized and allowed only when no other alternative is practicable or feasible.
Minor Arterial	City street standards for minor arterials shall provide for intra-community roadways that connect community centers and facilities. Minor arterials should be designed to accommodate predominantly "through" traffic with limited local access, and multiple local bus routes (or local connections for express routes), with controlled direct access to abutting land uses.
Collector Arterial	Collector arterial street standards shall provide for traffic movement within a community, including connecting neighborhoods with smaller community centers. Connections should also be provided to minor and principal arterials. Collector arterials should be designed to provide access to residential property, as well as commercial and industrial developments, with a lower priority for through traffic movement. Collector arterials should also be designed to support local bus routes serving residential areas and to provide rapid access to residential neighborhoods for emergency vehicles. The City will apply flexible design standards for collector arterials to match land uses, available right-of-way, topography, other design constraints, and funding.
Local Street	City street standards shall ensure that local streets provide access to abutting properties and should include a variety of designs and spacing, depending on access needs.

Freeways/Expressways

The street and highway system serving Burien includes two major state highways: SR 509 and SR 518. SR 509, which divides the City of Burien, is a four-lane freeway providing north/south access to and through the area. The freeway connects with the 1st Avenue S Bridge north of Burien to provide a direct link with Seattle via SR 99. To the south, SR 509 connects with SR 516 in Des Moines. There are full interchanges with SR 509 at S 128th Street, S 148th Street/SR 518, and S 160th Street. At S 146th Street, there is partial access to SR 509 via a half diamond interchange that provides ramps to/from the north. Roadways that provide east/west access across or under SR 509 within Burien include S 128th Street, S 136th Street, S 146th Street, S 152nd Street, S 156th Street, S 160th Street, S 188th Street, and Des Moines Memorial Drive S. To the south, the SR 509 freeway terminates at S 188th Street north of the City of Des Moines. Currently, arterial streets south of S 188th Street are designated as the existing SR 509 route to access Des Moines and SR 516. Unimproved right-of-way (ROW) for extending SR 509 as a limited access freeway exists between S 188th Street and Kent-Des Moines Road (SR 516). In 2002, WSDOT completed environmental studies for a project to extend the freeway south of S 188th Street to connect with I-5, when funding becomes available.

SR 518, which terminates at an intersection with 1st Avenue S, is a six-lane freeway providing east/west access to the City of Burien. SR 518 also provides access to/from Seattle-Tacoma (Sea-Tac) International Airport, Tukwila, and Renton to the east. It becomes I-405 at its interchange with I-5. SR 509 and SR 518 intersect just east of the Burien central business district (CBD). West of the SR 509/SR 518 interchange, SR 518 becomes SW 148th Street, which is designated as a principal arterial from 1st Avenue S to Ambaum Boulevard SW in Burien. Traffic signals control traffic operations at the SR 509 ramps and at 1st Avenue S west of the SR 509/SR 518 interchange. There is also a half-diamond interchange at Des Moines Memorial Drive S to access SR 518. These ramps serve SR 518 to/from the east. WSDOT also has plans for improvements along SR 518 between Burien and I-5 as recommended in the *SR 518 Route Development Plan* (2002). Plan recommendations include an SR 509/SR 518 interchange. The recommended concept is a hybrid combination of limited access and local connections through a single interchange. Burien and other jurisdictions are actively pursuing the advancement of improvements at this interchange.

The State has designated both SR 509 and SR 518 as Highways of Statewide Significance (HSS). HSS facilities provide and support transportation functions that promote and maintain significant statewide travel and economic linkages. The State plans for this HSS facility are developed from a statewide perspective. These plans include policy development and accompanying funding support to represent a broad range of interests that depend on the facility. Because of the HSS designation, the State has the authority of setting the LOS standards for SR 509 and SR 518, and they cannot be included in the City's concurrency transportation program.

Principal Arterials

The primary north/south arterial in the study area is 1st Avenue S. South of 146th Street, 1st Avenue S is a five-lane principal arterial with two through lanes in each direction and a center, two-way, left-turn lane. North of 146th Street, 1st Avenue S consists of two travel lanes in each direction with left-turn pockets at two intersections, 128th and 136th Streets. The roadway parallels SR 509 and serves sub-regional traffic, as well as access to major east/west routes and commercial developments. 1st Avenue S connects Burien with Normandy Park and Des Moines to the south and unincorporated King County (White Center area) and Seattle to the north. The posted speed limit on 1st Avenue S is 35 miles per hour (mph) and parking is generally prohibited on both sides of the street, though on-street parking exists at SW 136th Street.

Ambaum Boulevard SW, north of SW 148th Street, is classified as a principal arterial. This section of Ambaum Boulevard SW connects the Burien business district with communities in south Seattle via Delridge Way SW to the north. South of SW 148th Street, Ambaum Boulevard SW is designated as a minor arterial and provides access to major east/west connections in south Burien. Ambaum Boulevard SW also provides access to the west side of the Burien business district. In general, the roadway provides two travel lanes in each direction with a center, two-way, left-turn lane in the downtown area, with no parking on both sides of the street. The posted speed limit is 35 mph.

The major east/west arterials serving the City of Burien are SW 128th Street and SW 148th Street. SW 148th Street is a four-lane principal arterial connecting SR 518 and Ambaum Boulevard SW. It provides service between the residential areas in the western part of the City and primary access to the freeway. The roadway has two travel lanes in each direction with an additional center, two-way, left-turn lane between 1st Avenue S and 6th Avenue SW. SW 148th Street has a speed limit of 35 mph, with parking prohibited on both sides of the street.

West of SR 509, SW 128th Street is a four-lane principal arterial located along Burien's northeastern city limits. East of SR 509, S 128th Street is classified as a minor arterial. The roadway is a major east/west connector between Ambaum Boulevard SW and Des Moines Memorial Drive, east of SR 509. The SW 128th Street interchange provides a major access to SR 509. The posted speed limit on SW 128th Street is 35 mph. East of Ambaum Boulevard SW, parking is prohibited on both sides of SW 128th Street. West of Ambaum Boulevard SW, parking is permitted on both sides of the street, which is classified as a local street.

S 188th Street, in the southeast part of the planning area, is also classified as a principal arterial. This is a WSDOT-maintained roadway commonly referred to as Old SR 509. At the west end of the roadway, S 188th Street becomes Des Moines Memorial Drive. To the east, the roadway provides direct access to Sea-Tac International Airport, SR 99, and I-5. This roadway lacks sidewalks and bicycle facilities.

Minor Arterials

Des Moines Memorial Drive is a north/south minor arterial that defines much of the eastern City limits of Burien. Most of Des Moines Memorial Drive is within SeaTac city limits, but this facility affects transportation and livability in Burien (from SR 509 underpass to Ambaum Boulevard SW is in Burien city limits). South of S 128th Street, Des Moines Memorial Drive is a two-lane, 35-mph roadway. The roadway provides access to residential areas and businesses east of SR 509 and generally separates Burien from the City of SeaTac. Des Moines Memorial Drive parallels SR 509 to the east and connects with SR 99 to the north. A half-diamond interchange provides access to/from SR 518 to the east.

Other minor arterials in Burien include SW 156nd and SW 160th Streets, east of 4th Avenue SW. These two roadways, in addition to the principal arterials discussed earlier, serve east/west traffic flow within Burien. They support both local and through traffic between Burien neighborhoods, commercial centers, and industrial areas. SW 156th Street is four lanes from Ambaum Boulevard S to Des Moines Memorial Drive S with a posted 35 mph speed limit. SW 152nd Street is a two-lane roadway and was recently reconstructed between Ambaum Boulevard S and 1st Avenue S to include on-street parking in the downtown core and reduce the roadway from four to two lanes. SW 160th Street has two travel lanes in each direction east of 4th Avenue SW. The street supports traffic between SR 509 and 1st Avenue S to the neighborhoods located in the southwest corner of the City. The roadway also provides access to Highline Community Hospital. SW 160th Street has one lane in each direction west of 4th Avenue SW, and is a collector arterial.

Collector Arterials

A number of collector arterials in the planning area provide east/west traffic flow within the local neighborhoods. In the northern part of the City, east/west collector arterials include SW/S 116th Street (from 26th to 12th Avenues SW), and SW/S 136th Street (from Ambaum Boulevard SW to Des Moines Memorial Drive S). East/west travel in the central and southern parts of the city are served by SW/S 146th Street (from Ambaum Boulevard SW to Des Moines Memorial Drive S), SW 150th Street (from Ambaum Boulevard SW to 1st Avenue S), and S/SW 152nd Street (from 21st Avenue SW to Des Moines Memorial Drive).

Collector arterial designations also apply to north/south oriented roadways including 4th Avenue SW (from S 128th Street to SW 160th Street), 8th Avenue SW/8th Place SW (from Ambaum Boulevard SW to Sylvester Road SW), and 8th Avenue S (from S 128th Street to Des Moines Memorial Drive S). Sylvester Road is a collector arterial serving as an extension of 4th Avenue SW south of S 160th Street. The collector arterials in the Burien area provide access between residential areas of Burien and the principal arterials, freeway system, and/or commercial areas. In general, these are two-lane roadways with turn lanes and traffic signals at a limited number of cross streets.

Collector arterials also connect residential areas west of Ambaum Boulevard SW within the CBD and principal arterial system. The residential loop routes including SW 152nd Street, 21st Avenue SW, Maplewild Avenue SW, SW 172nd Street, Marine View Drive, 16th Avenue SW and Sylvester Road SW connect Ambaum Boulevard SW with the residential communities of Three Tree Point, Gregory Heights, and Seahurst, as well as the City of Normandy Park. Other local roadways in the area essentially serve access between residential, recreational, or industrial areas and the primary roadways described above.

Local Streets

The remaining roadways within the City are classified as “local streets” and primarily provide for property access within Burien. They generally have two travel lanes, 25 mph speed limits, on-street parking, and provide access between residential or business areas and the arterials.

Truck Routes

Figure 4.8-3 shows the designated truck routes for the City of Burien. The truck route code (Burien Municipal Code Section 10.40.060) directs trucks to use arterials as truck routes within the city. Vehicles exceeding 10,000 pounds (except busses) are prohibited on all local streets, except cases where usage is necessary for pick-up or delivery. All of the truck routes in Burien are marked. The following roadways are designated as truck routes in Burien:

- 1st Avenue S
- SW/S 128th Street (between Ambaum Boulevard SW and SR 509)
- Ambaum Boulevard SW (between SW 128th Street and SW 148th Street)

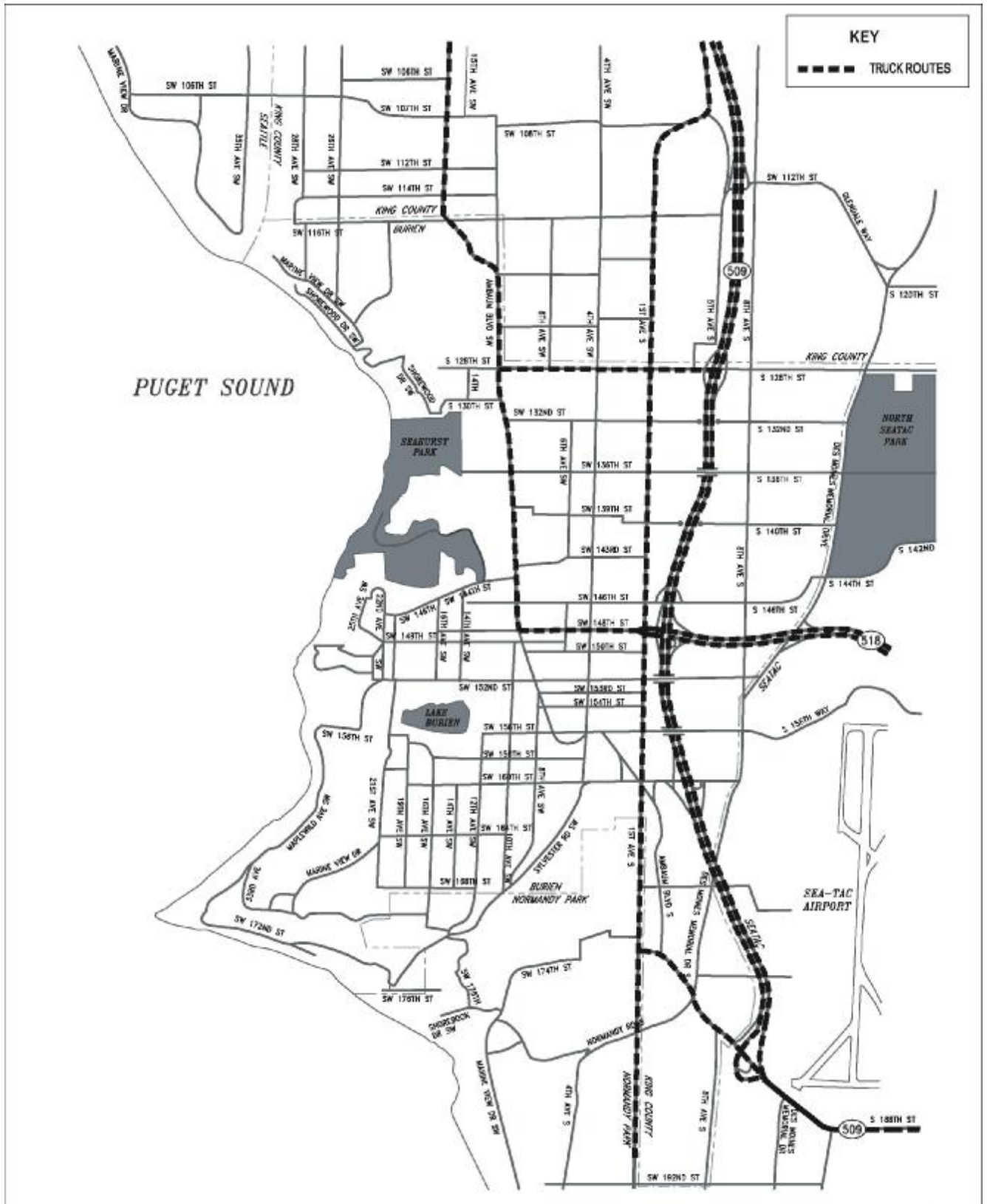


Figure 4.8-3 - Primary Truck Routes

November 2003



Source: The Tranepo Group 2003
p115066.01: Burien_Crit_Comp/Graphics/Figures/FinalPDFs/Figure483.pdf

Back of Figure 4.8-3 Primary Truck Routes

- SW 148th Street (between Ambaum Boulevard SW and 1st Avenue S)
- 174th Street S/S Des Moines Memorial Drive (between 1st Avenue S and SR 509)

The truck routes are intended to safely and efficiently accommodate the movement of goods associated with commercial or industrial uses within the city. They also identify routes that are most appropriate for long haul trucking and through truck traffic.

The assigned truck routes direct trucks to use freeways and principal arterials. These roadways provide access to the major commercial activity centers in the City while minimizing the impacts on neighborhoods. These streets are also designed to a higher standard that can more readily and safely accommodate trucks. Truck use of minor or collector arterials and local streets, is limited to local deliveries.

4.8.2 Traffic Volumes

PM peak hour traffic volumes were collected from a variety of sources including King County, WSDOT, and traffic impact analyses for proposed developments in the area. In addition, manual PM peak hour turning movement counts were collected to supplement data. The volumes reflect 2002 conditions and represent the highest one hour period between 4 to 6 p.m. The existing PM Peak traffic volumes for the state highways, principal arterials, minor arterials, and major collector arterials are summarized in Figure 4.8-4.

A review of PM peak hour traffic data indicates that depending on the roadway, some have experienced fairly significant growth, while others have had very little or no traffic volume growth during the last nine years. Both SR 509 and SR 518 have experienced slight increases in traffic volumes compared to 1993 counts. A few roadways have shown a slight decline in volumes in the last nine years. Most of the arterials have experienced less than 1-percent-per- year growth during the previous nine-year period. Collector arterials have experienced similar growth trends in the study area.

Freeways

The two state highways, SR 518 and SR 509, carry the highest traffic volumes in the study area. First Avenue S, through the City's CBD, also carries fairly high traffic volumes since it serves through traffic as well as providing access to commercial uses. PM peak hour traffic volumes on SR 509 continue to be roughly 10% of daily volumes. PM peak hour volumes on SR 518 are approximately 8% of daily volumes. The lower percentage of peak hour traffic on SR 518 represents increased congestion levels on freeways east of Burien.

SR 518, east of the SR 509/ SR 518 interchange, carries approximately 5,300 vehicles during the PM peak hour. As SR 518 enters the study area east of Des Moines Memorial Drive interchange, it has seen a 63-percent increase in PM peak hour vehicle traffic during the last nine years. Much of the increase in the westbound PM peak hour traffic along SR 518 exits the freeway at the SR 509 interchange and heads northbound on SR 509 before reaching 1st Avenue S. The ramp volumes at both Des Moines Memorial

Drive S and SR 509 have increased to absorb the entire 63-percent increase in additional vehicles. The half-diamond interchange at Des Moines Memorial Drive S serves close to 940 vehicles to/from the east via SR 518 in the PM peak hour. However at the intersection of SR 518 and 1st Avenue S, the PM peak hour volumes heading east along SR 518 have decreased by 7% since 1993. The reduction at this intersection is thought to be primarily due to vehicles avoiding the eastbound congestion along SW 148th Street.

The SR 509 ramps to/from the north at the SW 128th Street interchange have a PM peak hour volume of 560 vehicles, while nearly 1,420 vehicles utilize the ramps to/from the south. The 2002 PM peak hour volumes on the SW 128th Street interchange have increased by less than 10% since 1993. Ramp volumes at the SR 509/SR 518 interchange are substantially higher, with more than 2,245 vehicles to/from the north and 860 vehicles to/from the south during the PM peak hour. The volumes to/from the north have increased approximately 23%, while the volumes to/from the south have remained fairly constant during the past nine years. More than 1,050 vehicles enter or exit SR 509 to/from the north at the S 160th Street interchange, while nearly 565 vehicles use the interchange to/from the south. The S 160th Street interchange has experienced a drop in usage of almost 24% for the ramps to/from the north and 10% for the ramps to/from the south. Near its freeway termination at S 188th Street, SR 509 carries 3,440 vehicles in both directions during the PM peak hour, representing a 12% increase in volumes since 1993.

Except for the SW 128th Street interchange, aggregate PM peak hour ramp volumes along SR 509 indicate that the prevailing travel pattern is to/ from Seattle to the north. Almost 3,900 vehicles utilize SR 509 interchange ramps to the north, with just more than 2,850 vehicles connecting with S 188th Street to the south. The total volumes along SR 509 ramps have not changed significantly since 1993, with a decrease of 2% to/from the south and an increase of 7% to/from the north.

Arterial Roadways

On most of the arterials in the study area, peak hour traffic volumes were found to represent 9 to 12% of total daily traffic volumes, which is typical for cities similar to Burien in size and location within an urban area. Many of the major north/south roadways including Ambaum Boulevard SW, 4th Avenue SW, 1st Avenue SW, 8th Avenue S, and Des Moines Memorial Drive, experience slightly higher traffic volumes than major east/west roadways. This is primarily due to the physical separation created by SR 509 and the historical development of White Center and Burien as residential areas linked to Seattle.

Table 4.8-2 compares the 2002 PM peak hour traffic volumes to counts collected in 1993. The roadway volumes fluctuate depending upon the location the count is taken. As shown in Table 4.8-2, PM peak hour traffic volumes on 1st Avenue S range from 1,290 vehicles at the north end of the study area, 1,660 vehicles at the south end, and 2,100 vehicles near SW 148th Avenue. The large volume on 1st Avenue S near SW 148th Street reflects the influence of SR 518 as the primary access to/from the east. In addition, traffic volumes in this section include a substantial number of short local trips associated with the

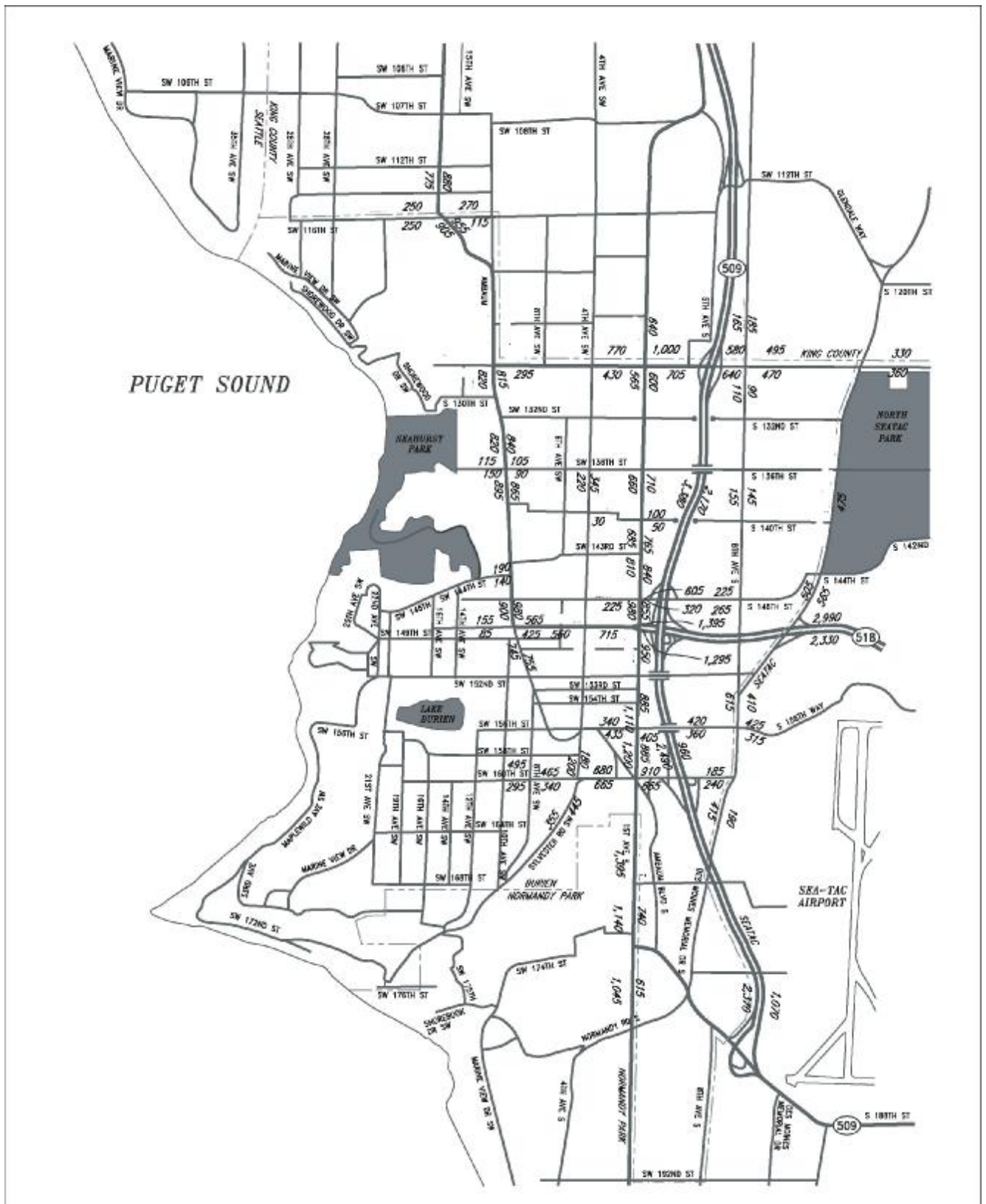


Figure 4.8-4 - Existing PM Peak Hour Traffic Volumes

November 2003



Source: The Tranepo Group 2003
p11s066.01: Burien_Crit_Comp/Graphics/Figures/FinalPDFs/Figure484.pdf

Back of Figure 4.8-4 Existing PM Peak Hour Traffic Volumes

Table 4.8-2 Traffic Volume Comparisons

North-South Roadways		1993		2002		NB %	SB %
Roadway	Location	NB ¹	SB	NB	SB	Change	Change
1 st Ave S	s/o ² SW 128 th St	495	500	600	565	21	13
	n/o SW 148 th St	885	930	885	980	-3	5
	s/o SW 156 th St	850	1200	885	1200	4	0
4 th Ave SW	s/o SW 148 th St	1,260	1,025	1,015	870	19	-15
	n/o 160 th St	120	145	180	200	50	38
Ambaum Blvd	n/o SW 128 th St	1,260	1,025	1,015	870	19	-15
	n/o SW 148 th St	970	975	980	900	1	-8
8 th Ave S	s/o SW 136 th St	90	150	145	155	61	3
East-West Roadway		EB	WB	EB	WB	EB %	WB %
Roadway	Location					Change	Change
SW 128 th St	e/o Ambaum Blvd	350	580	295	480	16	-17
	e/o 1 st Ave S	700	965	705	1,000	1	4
SW 148 th St	e/o Ambaum Blvd	460	580	425	565	-8	-3
	w/o 1 st Ave S	990	860	715	765	-28	-11
SW 160 th St	w/o 1 st Ave S	590	685	665	680	13	-1

¹ NB=northbound, etc.² s/o=south of, etc.

Source: The Transpo Group 2003

commercial businesses along 1st Avenue S. The volumes on the north end have increased by almost 28%, the south has seen an increase of 15%, and the area around 148th has grown only 4% during the last nine years.

Ambaum Boulevard SW carries more than 1,885 at the north end of the study area and 1,500 vehicles to the south during the PM peak hour. The volumes along Ambaum Boulevard have declined in the north by more than 17% and in the south by about 3% since 1993. Possible reasons for the reductions could be associated with the high unemployment rate in the region and less drivers commuting between Seattle and Burien or areas farther south. SW 160th, SW 148th, and SW 128th Streets all experience traffic volumes close to or slightly greater than 1,500 vehicles during the PM peak hour. Traffic volumes on other streets throughout Burien are typically lower than 1,000 PM peak hour vehicles. These east/west arterials serve as part of the city grid system helping to distribute traffic over a larger area and facilitate access to the freeways.

4.8.3 Traffic Operations and Level of Service

Existing traffic conditions at key intersections in the study area were re-evaluated and capacity analyses were conducted using the 2000 *Highway Capacity Manual (HCM)* (Transportation Research Board) methodologies. Synchro 5.0 is a traffic operations software package that is based upon the methodologies of HCM 2000 and was used for

the operational analysis. Level of service (LOS) functions as a tool to qualitatively measure the operational conditions of the transportation system. Levels of service values range from LOS A to F. LOS A indicates free-flow traffic with little or no delay while LOS F indicates extreme congestion with lengthy delays. At signalized intersections, LOS is defined in terms of average delay per vehicle. The procedure also calculates a volume-to-capacity (v/c) ratio; a v/c ratio of 1.0 or greater represents an intersection at capacity. At unsignalized intersections, LOS is measured in terms of the reserve (or unused) capacity available for critical turning movements.

Level of Service Standards

The City adopts the following Level-of-Service standards: LOS E for First Avenue South; LOS D within the urban center boundary (as shown in Figure 2LU-1.11) and for the intersection of SW 138th Street and Ambaum Boulevard SW; and LOS C for all other roadways and facilities (except state facilities). The Washington Department of Transportation has adopted a LOS D standard for Highways of Statewide Significance in urban areas, and a LOS E/mitigated standard for Highways of Regional Significance (non-HSS) in Tier 1 inner urban areas. Inner urban areas are defined as a 3-mile buffer around the most heavily traveled freeways in the region (in this case, SR 520). State law requires that local jurisdictions adopt in their Comprehensive Plans the State's Level of Service Standards for HSS and non-HSS designated roadways and facilities. As mandated by state law, the City of Burien adopts LOS D for SR-509 and SR-519, which are designated as HSS. The City adopts LOS D for HSS-designated facilities and intersections, including the S 128th Street/SR 509 ramps, S 146th Street/SR 509 ramps, SW 160th Street/SR 509 ramps, and Des Moines Memorial Drive/SR 518 ramps. The City also adopts LOS E/mitigated for the segment of SR 509 between 1st Avenue South and SeaTac City Limits, which is designated as a non-HSS (regional) facility.

Existing Level of Service

The existing LOS for each intersection within the study area is listed in Table 4.8-3. Most major intersections in the study area are controlled by traffic signals. Along 1st Avenue S through the CBD, all major roadway intersections are signalized. SR 509 ramp intersections are signalized at SW 128th Street and SR 518. Most intersections of collector arterials with local streets are controlled with stop signs on the minor traffic approaches.

The intersection LOS analysis was performed for the major intersections within the study area to represent 2002 conditions. In the analysis of 1993 conditions, 1st Avenue S/SW 148th Street was the only intersection within the City of Burien that operated below LOS D during the PM peak hour. The 2002 LOS analysis results shown in Table 4.8-3 list five intersections within the City operating below LOS D.

The LOS analysis identified that the 1st Avenue S/148th Street SW intersection has dropped to an LOS F since 1993. This intersection continues to carry the highest traffic volumes within the city and is essentially approaching full build-out in its present configuration. The split signal phasing and proximity of the ramp signals at SR 509 contributes to delays for east/west traffic. The southbound left-turn movement continues

Table 4.8-3 2002 PM Peak Hour Level of Service, City of Burien

Intersection	LOS ¹	Delay ²	V/C ³ or WM ⁴	Signalized	LOS Standard ⁵
Ambaum Blvd & 116th St	C	31	0.68	Y	C
Ambaum Blvd & 128th St	D	43	0.71	Y	C
Ambaum Blvd & 136th St	A	7	0.35	Y	C
Ambaum Blvd & 144th St	A	4	0.35	Y	C
Ambaum Blvd & 146th St	B	10	0.50	Y	C
Ambaum Blvd & 148th St	C	25	0.72	Y	C
Ambaum Blvd & 152nd St	C	25	0.48	Y	C
Ambaum Blvd & 153rd St	B	20	0.26	Y	C
4th Ave/Sylvester & 160th St	C	25	0.82	Y	C
4th Ave SW & 156th St	A	8	0.54	Y	C
4th Ave SW & 152nd St	A	9	0.60	Y	C
4th Ave SW & 148th St	B	12	0.61	Y	C
4th Ave SW & 146th St	B	12	0.49	Y	C
4th Ave SW & 136th St	B	11	0.43	Y	C
4th Ave SW & 128th St	A	9	0.49	Y	C
1st Ave S & SW 128th St	F	146	0.88	Y	D
1st Ave S & SW 136th St	B	11	0.39	Y	D
1st Ave S & SW 140th St	B	11	0.43	Y	D
1st Ave S & SW 143rd St	B	14	0.61	Y	D
1st Ave S & SW 146th St	D	45	0.69	Y	D
1st Ave S & SW 148th St/SR 518	E	71	0.83	Y	D
1st Ave S & SW 150th St	F	>200	EBL	N	D
1st Ave S & SW 152nd St	E	64	0.83	Y	D
1st Ave S & SW 153rd St	D	28	EBL	N	D
1st Ave S & SW 156th St	C	30	0.63	Y	D
1st Ave S & SW 160th St	F	90	1.03	Y	D
1st Ave S & SW 174th St	C	22	0.44	Y	D
8th Ave S & S 128th St	A	7	0.39	Y	C
8th Ave S & S 136th St	A	7	0.38	Y	C
8th Ave S & S 140th St	B	11	EB	N	C
8th Ave S & S 146th St	B	12	EB	N	C
8th Ave SW & SW 160th St	A	7	0.52	Y	C
Des Moines Mem. Dr. & Ambaum Blvd	A	8	0.57	Y	C
S 160th St & Albertson's Driveway	B	20	0.49	Y	C
SW 160th St & Ambaum Cut-Off	D	34	SBL	N	C

¹ Level of service.² Average delay in seconds per vehicle.³ Volume-to-capacity ratio.⁴ Worst movement; EB = Eastbound, SWBL = Southwestbound Left, etc.⁵ Currently adopted City LOS standards.

Note: Shading indicates intersections not meeting the City's LOS standards.

Source: The Transpo Group 2003

to be heavy, but the westbound movements now experience the worst delays at the intersection. However, the intersection experiencing the worst overall delay is 1st Avenue S/SW 128th Street, which has traffic volumes lower than 1st Avenue S/148th Street SW, but sees a higher delay as a direct result of the inefficient split-phase signal timing and lack of left turn pockets on the east and west approaches.

Similar to 1993, most of the PM peak hour congestion continues to exist along 1st Avenue S and Ambaum Boulevard SW, the two principal north/south arterials with the highest traffic volumes. Traffic signals along these roadways contribute to traffic queues that impact operations and result in delays between intersections. In addition, the many driveways along the corridors, that provide access to local businesses, also contribute to operational delays. The 1st Avenue S design study and roadway reconstruction project under consideration by the City would help alleviate some of the operational delays at intersections and provide for greater mobility along that corridor. (Proposed improvements for the southern end of 1st Avenue S between S 146th Street and S 160th Street are discussed in the *1st Avenue Operations Study* report on file with the City of Burien).

Burien Commuters

The U.S. Census provides statistics on the number of people that commute to work and the mode of transportation by which they choose to travel. Table 4.8-4 provides a summary of this information for the City of Burien and King County in the year 2000. As indicated, the average commute time for Burien residents is approximately 25 minutes, slightly longer than the average King County commute.

4.8-4 Commuter Transportation Choices and Travel Times				
Transportation Mode	City of Burien	Percentage	King County	Percentage
Total Commuters	15,521	100%	911,677	100%
Single Occupancy Vehicles	10,664	69%	626,576	69%
Carpool	2,647	17%	109,573	12%
Public Transportation	1,246	8%	87,298	10%
Walk or Bicycle	230	1%	40,956	4%
Motorcycle or other means	221	1%	6,859	1%
Work at home	513	5%	40,415	4%
Mean travel time to work (minutes)	25.1		24.2	

Source: U.S. Census 2000.

In general, Burien commuters choose similar transportation modes and spend similar amounts of time on the road that the average commuter in King County. Approximately 69 percent of Burien commuters travel to work alone. More commuters carpool to work in Burien (17%) than the King County average (12%), although fewer non-motorized trips to work occur in Burien (1%) than average for King County (4%).

4.8.4 Traffic Safety

Intersection Analysis

Mid-block and intersection accident data were reviewed to understand recent traffic safety issues. The accident analysis included accident data from January 1, 1999 through December 30, 2001 provided by WSDOT and the City of Burien. Accident data for arterial intersections having four or more accidents per year was extracted from the City of Burien accident database and reviewed in more detail. Four or more accidents is a threshold estimated to capture any intersection that could be a high accident site on the arterial roadway system. Local street intersections were not evaluated because limited information or data existed.

Accident data were evaluated in terms of accident rates as well as number of accidents. A “high accident location” (HAL) can be identified as a location that experienced more than ten accidents at a signalized intersection or five at an unsignalized intersection⁶ during any given year. In addition, accident rates at intersections were analyzed in terms of accidents per million entering vehicles (acc/mev). Many jurisdictions consider an accident rate of approximately 1.0 acc/mev as average.

The SR 509/SR 518 interchange continues to have the highest accident occurrence with an average of almost 29 accidents per year for the western half of the interchange, which includes the intersection with the southbound SR 509 on/off ramps. Nearly 90% of these accidents are associated with right-angle-turning movements to/from the ramps at the intersection. This intersection, which is at the termination point of the SR 518 freeway, has been a HAL for many years and was highlighted in the previous transportation plan. The location requires drivers to decelerate from 60 mph to a complete stop. In the past, several WSDOT safety projects have been implemented in an attempt to reduce the number of accidents at the SR 509/SR 518 interchange. Those projects included larger advance warning signs and reconstruction of the intersection to enhance visibility. The safety improvements did not contribute significantly to a decrease in the accident rates. It is not expected that WSDOT will provide any other safety improvements until funding for the SR 518 Route Development Plan (RDP) becomes available. The RDP documents a long-range plan for the corridor that will provide grade separation between the southbound SR 509 off-ramp and the SR 518 mainline. The improvements would relieve congestion and improve safety at the intersection.

The highest number of accidents along arterials occurs at the intersections along 1st Avenue S. This section of roadway has the highest traffic volumes and most vehicle conflicts within the study area. However, although the number of accidents each year is high compared to other intersections in the study area, the accident rate per million entering vehicles is not overly significant. For example, the 1st Avenue S/SW 128th Street intersection experienced 15 accidents during the three-year study period (5.0 acc/yr); however, the number of accidents per million entering vehicles is only 0.5 acc/mev, which would be considered less than average for similar locations. The accidents at 1st Avenue S/SW 128th Street have declined somewhat since the last transportation element

⁶ Thresholds identified by the City of Seattle.

update (1993). Previously, the intersection had a rate of 0.7 acc/mev and an average of more than 8.0 acc/yr. Other intersections along 1st Avenue S, such as 1st Avenue S/SW 146th Street (9.7 acc/yr, 1.0 acc/mev) and 1st Avenue S/SW 136th Street (8.0 acc/yr, 1.2 acc/mev), have shown a small increase in the number and rate of accidents compared to 1993. This corridor, however, experiences the most pedestrian and

The 1st Avenue S/SW 148th Street intersection experienced 51 accidents (17.0 acc/yr) during the study period. This equates to 1.1 acc/mev, a slight increase since the last transportation plan update. An evaluation of contributory causes at this location indicated that a quarter of the accidents were sideswipes, which might indicate vehicles trying to change lanes or merge into the appropriate lane to navigate through the intersection.

Intersections with Ambaum Boulevard SW between SW 116th Street and SW 148th Street also continued to experience a number of accidents. Most of the accidents were at intersections of east/west arterials with Ambaum Boulevard SW. The two highest accident locations were at Ambaum Boulevard SW/SW 128th Street (9.0 acc/yr, 1.1 acc/mev), and Ambaum Boulevard SW/SW 136th Street (9.0 acc/yr, 1.3 acc/mev). Accident rates at the other intersections along Ambaum Boulevard SW have experienced less than 1.0 acc/mev. Although the accident rates are not overly significant, a fair number of pedestrian accidents have occurred on this corridor. The Ambaum Boulevard SW Pedestrian Safety Improvements project will address some of the safety concerns. Others may be addressed through the *Pedestrian and Bicycle Facilities Plan*, planned for 2004.

Other intersections that had an accident rate greater than the 1.0 average included 4th Avenue SW/SW 148th Street (9.0 acc/yr, 1.2 acc/mev) and 4th Avenue SW/SW 152nd Street (7.0 acc/yr, 1.2 acc/mev). However, with the recent narrowing to a two-lane roadway and pedestrian improvements along SW 152nd Street, accident rates are expected to drop in the coming years.

Roadway Segment Analysis

This section evaluates the number of accidents and associated accident rates for roadway segments with potential safety problems. Roadway segments between intersections vary in length and traffic volume. To provide meaningful comparison, accidents at roadway segments are typically analyzed in terms of accidents per million vehicle miles (acc/mvm) traveled. No universally accepted guidelines exist for identifying hazards based on accident rates for roadway segments; however, WSDOT and King County publish average accidents rates by roadway classification

Based on the accident information, the roadway segments with the highest traffic volumes generally experience the greatest number of accidents. Principal arterials such as Ambaum Boulevard and 1st Avenue S that carry traffic volumes in excess of 15,000 vpd are typically the locations where existing safety problems are found. Rear-end collisions continue to constitute the majority of the accidents along Ambaum Boulevard and 1st Avenue S, which is common for arterials with relatively high traffic volumes.

Several City roadways were found to experience lower-than-average accident rates than comparable state facilities. City of Burien roadways such as 1st Avenue S operate similarly to their corresponding counterpart on the state system. Accident rates account for the variation in traffic volumes along separate roadways, so comparing the state accident rates against those found along City of Burien roadways is a useful process. It helps in quickly locating any roadways that pose a serious safety concern within the City but does not necessarily exclude the City from being concerned with a rate substantially lower than the state average, depending on the type of accident. The King County accident rates do not necessarily provide an adequate comparison; most arterials maintained by the King County Department of Transportation are primarily in rural areas or along the urban fringes as a result of recent city incorporations/annexations.

The roadway segment showing the highest accident rate in the City continues to be SW 152nd Street between Ambaum Boulevard SW and 1st Avenue S. SW 152nd Street serves as the main street in Burien's business district and has recently been reduced from four to two lanes while also adding pedestrian and parking improvements. Nearly all of the accidents that occurred along this section were at commercial driveways or involved parking movements. Due to the recent roadway improvements along SW 152nd Street, it is expected that accident rates will decrease along this section of road in the coming years.

Fatalities

Three fatality accidents have occurred in the three-year period between 1999 and 2001. Each accident was at a separate location with one of the three fatalities occurring along SR 509 within the City limits. The other two fatalities were located mid-block along 1st Avenue S between SW 156th Street and SW 160th Street, and at the Ambaum Boulevard SW/SW 124th Street intersection. The accident on 1st Avenue S involved a pedestrian who collapsed on the roadway and was struck by a vehicle. The accident on Ambaum Boulevard SW involved a vehicle striking a light pole. The accident on SR 509/SW 128th Street involved a drunk driver striking another vehicle.

Pedestrian/Bicyclist Accidents

Accidents involving vehicles and pedestrians or bicyclists are of high concern because of the serious injuries they can cause. Approximately 50% of the roadway and intersection locations evaluated as part of the safety analysis had one or more pedestrian or bicycle accident from 1999-2001. The locations having two or more accidents include:

- 1st Avenue S Corridor (SW 160th Street – SW 156th Street)
- 1st Avenue S Corridor (SW 143rd Street – SW 136th Street)
- SW 152nd Street Corridor (1st Avenue S – Ambaum Boulevard SW)
- Ambaum Boulevard SW/SW 146th Street intersection
- 1st Avenue S/SW 128th Street intersection

The accident rates along 1st Avenue S between SW 143rd and SW 136th Streets suggest that a higher number of accidents are occurring along that section of roadway compared to other roadways in the City. The accident rate is close to 1.7 acc/mvm, but only 2 of the 11 accidents involved pedestrians or bicyclists. That section of 1st Avenue S roadway sees more pedestrian activity than other sections due to its proximity to the high school. Pedestrian safety should improve along the corridor when the 1st Avenue S project is implemented. Pedestrian safety along SW 152nd Street should also improve due to the recent reconstruction of the roadway to two lanes with wider sidewalks, improved street lighting, and increased crosswalk visibility. However, the accident rates on the remaining 1st Avenue S locations are also anticipated to improve when the 1st Avenue S project is completed. This issue will be revisited as part of the *Pedestrian and Bicycle Facilities Plan* planned for 2004.

4.8.5 Transit Service

King County Metro Transit (Metro) and Sound Transit provide bus service in Burien. Most of the routes utilize the Burien Transit Center (BTC), which is currently located at 14900 1st Avenue S (SW 150th Street and 4th Avenue SW). The BTC includes a 403-space park-and-ride facility. According to Metro, the BTC is filled to or above 90% of capacity by 9 a.m. on weekdays.

The City and KC Metro are coordinating efforts to transform the transit center to a transit oriented development (TOD). The city has purchased property located east of 2nd Avenue to facilitate transit center/TOD development. Currently, this is envisioned as a two-step process: the first step would include improvements to the transit center to improve functionality and pedestrian safety, and the second step to support a transit oriented development consistent with Burien's downtown vision.

King County Metro Transit

As of February 2003, King County Metro Transit Routes that serve Burien include routes: 130, 130E, 132, 132E, 133, 135, 136, 136E, 137, 137E, 139 and 140. All Metro busses feature bicycle racks for multi-modal transportation options. Metro also runs vanpools and a Metro Ride Match that serve the Burien area. According to the Six-Year Plan, Burien contains two Commute Trip Reduction locations. Metro also provides paratransit services in the Burien area through their ACCESS Transportation program. Other services include rideshare programs through area employers.

The City of Burien, King County Metro, and Senior Services have coordinated to provide a senior shuttle that will serve citizens of Burien on an on-call basis. The shuttle's service boundaries include SW Roxbury Street to the north, Military Road S to the east and S 192nd Street to the south. The shuttle is available to residents aged 60 years or older who are able to board the shuttle with minimal assistance. The service operates from 8 a.m. to 5 p.m. Monday through Friday, and is free to users. Users must schedule the service by calling ahead of time. In 2004, King County Metro is scheduled to implement transit service changes in Burien intended to improve efficiency of transit in the area, particularly along the Ambaum Blvd. SW corridor.

Sound Transit

As of February 2003, Sound Transit serves Burien with Route 570. Route 570 currently runs only on weekdays between SeaTac Airport and the Seattle International District, via the BTC, White Center Transfer Point, Fauntleroy, West Seattle Junction, and SODO. The route runs approximately every half-hour during peak periods, but hourly at other times. The route includes Ambaum Boulevard SW and SW 148th Street in Burien.

4.8.6 Airport Facilities

Sea-Tac International Airport, located directly east of Burien, is the major air transportation center for the Puget Sound region. The airport handles both passenger and air cargo traffic. Although Sea-Tac International Airport is not located within Burien, the proximity of the airport and its operations substantially influence land use policies and traffic conditions in the Burien area.

The main vehicular access to Sea-Tac International Airport is located on the east side of the airport. Currently, Sea-Tac Airport is accessed from the east primarily via SR 518 or SR 99 (International Boulevard). Access from the west (including Burien) occurs primarily via SR 518 (north of the airport) and S 188th Street (south of the airport). SR 509 is a major north/south connection between Seattle and Sea-Tac International Airport, as it connects to SR 518 and S 188th Street. Other east-west roadways such as S 154th/S 156th Street, S 128th Street, S 136th Street, and S 144th/S 142nd Street also provide access to the airport from Burien via 24th Avenue S or SR 99 (International Boulevard). All of these routes allow access from Burien to the airport within several minutes.

Along with the airport itself, airport-related businesses are major traffic generators. The majority of the businesses that provide services for Sea-Tac International Airport are located along SR 99 (International Boulevard). Location of the airport facilities and services contribute significantly to traffic volumes on SR 518, SR 509, S 188th Street, and S 154th/S 156th Street.

The airport currently has two runways. One (16L/34R) is 11,900 x 150 feet, asphalt/grooved in good condition, and the other (16R/34L) is 9,425 feet x 150 feet, concrete/grooved in good condition. Aircraft operations average 1,023 per day. 59% of operations are commercial, 40% air taxi, 1% transient general aviation, and less than 1% military.

The Port of Seattle is in the process of expansion, which would affect land use and transportation in the Burien area. The following projects are part of the Port of Seattle's airport expansion plan: Third Runway, New Concourse A (South Terminal Expansion), Central Terminal Expansion and Pacific Marketplace, Restrooms, Satellite Transit System, Parking Garage Lighting Upgrade, and Seismic Reinforcements. In coordination with the Port of Seattle and the City of SeaTac, Burien has planned for the Northeast Redevelopment Area (NERA) and Special Planning Area 4 (SPA-4) in the Burien Plan and Burien Municipal Code. Expected land use changes will likely impact transportation on 8th Avenue S and Des Moines Memorial Drive.

4.8.7 Strategies to Improve Transportation Systems

Transportation Improvement Projects

Based on the evaluation of existing and forecast traffic demands and operations, a recommended list of transportation improvements was developed. The improvements include projects to improve safety, add capacity and maintain concurrency, preserve roadways, and upgrade roadways for economic development and enhancement. Design and implementation of specific improvement projects also must consider the level and type of pedestrian, bicyclist, and transit service anticipated for the facility.

Transportation Demand Management Program

In addition to increased transit service and high occupancy vehicle facilities identified above, a range of TDM programs are included as part of the City of Burien's Transportation Plan. The goal of a TDM program is to reduce the overall amount of travel by single occupant vehicles (SOVs) within the City. TDM programs target driver behavior rather than the infrastructure itself.

Commute Trip Reduction Act (CTR)

One of the most well-known TDM programs is the State Commute Trip Reduction Law (CTR; Revised Code of Washington 70.94.521-551). This law applies to all public and private employers that have 100 or more affected employees (employees reporting to work at a single work site between 6 to 9 a.m. on at least two weekdays each week within counties with 150,000 or more residents. CTR also applies to local jurisdictions where an affected employer is located, regardless of the number of affected employees at the jurisdiction worksite.

Affected employers are required to do the following (at minimum):

- Designate an Employee Transportation Coordinator (ETC);
- Display the ETC's name and contact information in a prominent location;
- Distribute information to employees about commute alternatives to driving alone (specific requirements may vary by jurisdiction);
- Implement a set of measures geared toward achieving the CTR goals;
- Measure employee commute behavior every two years; and
- Report annually about progress toward meeting CTR goals.

Each affected jurisdiction is required to have a CTR requirements and an ordinance. The City of Burien's mandatory CTR elements include: establishment of a Transportation Coordinator, Information Distribution (to new employees at time of hire and yearly information regarding alternatives to SOV commuting), and Additional Program Elements (include at least one additional element of the employer's choice).

The City of Burien provides the following information regarding commute options to its employees: carpool/vanpool matching, commuter information center (transit and

ridesharing), event promotion, and guaranteed rides home. Burien Municipal Code 10.60 includes the City's Commute Trip Reduction Plan. The Plan includes goals for commute trip reduction as well as requirements for employers.

Other TDM Strategies

Other TDM strategies to be considered include the following:

- **Transit Incentives.** New developments could be required to provide free or reduced rate transit passes to all employees. The subsidies could be limited to an initial trial period (e.g. three months) to allow employees familiarity with transit service options.
- **Private Carshares.** Increasingly, carshares are run through private companies that have a membership list. These types of carshares are used for business, education, or personal uses. For example, FlexCar provides a carshare program for the Seattle metropolitan area (85 vehicles). Members sign up for cars/vans, pay an hourly rate, and pick-up/drop-off the vehicle at designated spots around the region. This type of program can reduce the number of vehicles for some households.
- **Parking Management.** Parking strategies that can be successful in reducing SOV commuting can focus on either the supply or demand sides. On the supply side, limiting the parking supply to slightly less than or equal to the most accurate estimate of parking demand is considered because it makes driving alone less convenient. An oversupply of parking may undermine the effects of other TDM strategies. The parking supply for SOV commuters can also be limited by requiring special permits for SOV parking. On the demand side, employee parking charges have been an effective element of many employer-based demand management programs in this region and nationwide. Revenues generated from a parking charge program could be used to offset some of the costs of conditions. When implemented, parking management programs should include elements to keep employees from parking in adjacent residential areas or illegally parking on arterials. These can include residential parking permits for residents of the area, metered or time-limited (through signing) of on-street parking and increased enforcement.
- **Compressed Work Week.** Employers can be encouraged to participate in compressed workweek programs, with staggered off-days.
- **Flexible Work Schedules/Alternative Work Schedule.** Employers allow flexible work schedules that allow employees to adjust their schedules to accommodate carpool, vanpool, or transit opportunities. The flexible work schedule program can be expanded to allow employees to commute during non-peak hours, which helps to decrease future congestion.
- **Financial Subsidies.** Provision of financial subsidies to employees who commute via transit, carpool, vanpool, or bicycle.
- **Telecommuting.** The use of telecommunications technology for some employees to work from a remote site or their homes can be an effective TDM strategy by

shortening or eliminating peak period commute trips to primary office locations. This strategy has proven to be successful in many demonstration projects throughout the nation and one in this region.

- **Site Design.** Sidewalks or other hard surface pathways that connect to adjacent pedestrian and bicycle facilities should be provided on development sites. On-site design should not restrict direct pedestrian access to arterials and existing or possible future bus stops. Other amenities such as benches, trees, and attractive transit stop facilities should be provided in major residential developments.

4.9 UTILITIES

City utilities are divided into two categories: essential and optional utilities. Essential utilities include water and sewer services, stormwater drainage, electrical power, and solid waste services. As defined by City policies, adequate levels of essential utilities are considered a requirement for approval of developments proposed within the City. Optional utilities include natural gas and telecommunication services.

4.9.1 Water⁷

There are five separate water purveyors for the City of Burien: City of Seattle (Seattle Public Utilities), King County District No. 20, King County District No. 125, King County District No. 49, and the Highline Water District. Each of these districts is an independent special purpose district governed by an elected board that has its own staff. Their service areas are depicted in Figure 4.9-1. Most of the districts serve an area and population larger than Burien. Seattle Public Utilities (SPU) serves as the regional water supply source for all of these districts.

Currently, there are no shortages in water supply for the districts serving the city. The most common deficiency identified by the districts involves replacing undersized distribution lines to improve fire flow.

The most significant issue facing all of the water districts, including SPU, is ensuring that adequate water supply sources are available to meet future demands. All of the water districts within the city purchase their water from SPU.

The majority of the water districts based their estimates of future water demand on the Puget Sound Regional Council of Governments (PSRC) population forecasts by Forecast Analysis Zone (FAZ). Depending on when their plan was prepared, some districts supplemented PSRC's information with the King County Highline Community Plan's future land use map.

⁷ Information Sources: 1) *1994 Comprehensive Water System Plan Update*, King County Water District No. 20; 2) *Comprehensive Water System Plan Update*, Final March 1989, King County Water District No. 49; 3) *Comprehensive Water Plan*, 1976, King County Water District No. 85; 4) King County Water District No. 125; 5) *Draft Comprehensive Water System Plan*, Feb. 1995, Highline Water District; and 6) *Seattle Water Department Water Supply Plan*, Sept. 1993, City of Seattle.

Back of Figure 4.9-1 Water District Service Areas

King County Water District No. 20

Water District No. 20 serves the northeastern portion of Burien, covering approximately 32.5% of the city. However, Burien comprises approximately 33% of the District's total service area.

Within Burien, the District serves 2,933 single-family residences, 107 multifamily units, and 190 commercial activities. SPU serves as this District's water supply source. In addition, the District maintains emergency inter-ties with Districts 49~~7~~ and 125. District No. 20 also shares a reservoir with a capacity of 6 million gallons (mg) with Districts 49 and 125.

Issues:

- Similar to the other districts serving the City, District No. 20 will be faced with increased costs from renewed contracts with SPU.
- Construction of the majority of the infrastructure was completed in the 1950's and is considered in good condition. However, there are some unlined cast iron mains, which need to be replaced. In addition, part of the distribution system is composed of 4 inch pipes which need to be replaced to increase fire flow.

The District has received a \$2 million Public Works Trust Fund grant to replace the 4 inch pipes with 12 inch pipes. A significant portion of this work will be in Burien. Replacements are scheduled along 4th Avenue South between 126th and 144th Avenues SW, and between 1st and Ambaum between 142nd and 144th Avenues SW. After these replacements are completed, the only 4-inch pipe remaining in District No. 20 will be between 1st Avenue SW and SR 509 from 128th to 136th Avenues South.

- The District has no current source or fire flow capacity problems.
- According to their 1994 Comprehensive Water System Plan Update, the District will finance their proposed improvements using the proceeds from the Public Works Trust Fund, contributions in aid of construction, surplus operating revenues, and the excess of interest income over income expense.

According to Amendment No. 1 (Dated January 1999) of their 1994 Comprehensive Water System Plan Update, the District amended its capital improvement program by extending the CIP out an additional four years (2000-2003). Favorable conditions and efficient completion of the District's other service projects means that the expanded CIP should be able to complete replacement of the remaining 4-inch and smaller mains in the District by 2004. In addition, the expansion of Sea-Tac International Airport involves the relocation and reconstruction of South 154th Street/South 156th Way. This street at the north end of the airport complex is in both Water District No. 20 and No. 125. Due to the reconstruction, Water District No. 125 will be unable to serve the area. District 20 will, therefore, be providing water service through a new 12 inch main to a portion of District 125's current area as a result of the airport-related expansion. Installation of the new 12 inch water main along South 154th

Street/South 156th Way is part of the airport expansion and will not require any District funds.

- The District annexed the smaller Water District No. 85 in 2003 and assumed a larger share of water service within the City of Burien corporate limits. Water District No. 85's small size made it difficult for the rate base to sustain a significant capital improvement program.
- The newly added service area for District No. 20 includes the Seahurst area in the western portion of the City. The majority of the distribution system in this area consists of 4- to 8- inch diameter cast iron steel pipes, and was constructed in the 1950s. For the purposes of improving fire flow, the District is replacing the 4 inch diameter pipes with 8 inch pipes. Pipe replacement is paid for through revenues rather than grants. Consequently, the pipe replacement program is occurring at an incremental rate. Replacement is being accomplished moving from east to west through the District. At this point, most of the pipe east of 22nd Avenue SW has been upgraded to 8-inch pipe.

Water District No. 49

Water District No. 49 provides water to the largest portion of the City. The District is bordered on the north by SW 144th Street, on the west by Puget Sound, and runs past the southern border of the city into the City of Normandy Park. It currently serves approximately 12,828 people. District No. 49 has a fully developed grid of 53 miles of pipe at diameters of 4 to 8 inches. The District maintains emergency inter-ties with Districts 20, 125, and 75.

Extra water from SPU is taken during the low demand periods and stored in a half million gallon reservoir for use during periods of high demand. This process helps to limit the purchase of water from the City of Seattle during peak charge periods. Although the construction of a new well would have been more cost effective, it would have interfered with SPU operated wells. As a result, SPU contributed funds towards construction of the reservoir, and District No. 49 relinquished their certificates of ground water rights to the City of Seattle.

An additional water source is from the adjacent District No. 125. District No. 49 purchases water from District No. 125 on a temporary basis when the pump station on South 176th Street east of Des Moines Way South is shut down.

Issues:

- Similar to the other districts serving the city, District No. 49 will be faced with finding new water sources in the future or else face increased costs from renewed contracts with the City of Seattle.
- Pressure and service problems are negligible in Burien. Consequently, the proposed improvements are based on preventative maintenance. The District conducted an undersized pipe replacement program over the past five years. Minimum pipe size in the District is now 8 inch diameter.

- This District covers the downtown commercial areas. According to the District, pipe size in the downtown area is a minimum of 8 inches in diameter, which should be sufficient to provide adequate capacity and fire flow should the city plan for a much more intensive land use scenario than called for in the Highline Community Plan.
- There are no deficiencies in current capacity and fire flow within the city. In most cases, the system exceeds minimum requirements.
- In their *Comprehensive Water System Plan Update*, District 49 is projecting revenue to be available to implement the capital improvements which have been proposed for development during the next six years.

Water District No. 125

Water District No. 125 serves the smallest portion of the City, covering the area west of Des Moines Avenue between South 138th and 146th Streets. Within this area, 14 residential units and 7 commercial establishments are currently provided with water. Similar to the other water purveyors, the District purchases its water from the City of Seattle. The District shares reservoir storage capacity with District No. 20 to prevent summer peak demand rates from SPU. This reservoir is located in District No. 20. District No. 125 also maintains four inter-ties with District No. 20. Pipes 8 inches in diameter serve the majority of the area.

Issues:

- There are currently no source capacities or fire flow deficiencies in District No. 125.
- Similar to the other districts serving the city, District No. 125 will be faced with finding new water sources in the future or else face increased costs from renewed contracts with the City of Seattle.

Highline Water District

Highline Water District serves the southwest (Three Tree Point) and southeastern (Manhattan-Woodside) portions of the City. The District's existing water system is supplied by a combination of sources, water purchased from the City of Seattle and water produced by the District's two groundwater wells. There are two different pressure zones in Burien that are established by elevation - the 490 foot elevation zone and the Three Tree Point zone. The Three Tree Point zone is connected to the 490 zone (the 490 zone lies at a higher elevation, just east of the Three Tree Point area). For emergency water supply the District maintains emergency inter-ties with Districts 49 and 20 through which it can receive water into the Three Tree Point Zone.

The Highline Water District's infrastructure consists of 9 reservoirs, totaling 18 mg of effective storage, 6 pump stations, and 250 miles of pipeline. Pipelines range from 2 to 24 inches in diameter, with the majority being 6 to 8 inches in diameter. In 2000, the entire service area, including Burien, had approximately 17,000 connections. The District's *Comprehensive Water System Plan* was updated in 2002.

Issues:

- To ensure capacity, the District upgraded five of its six pump stations to more effectively draw water from existing sources. The District plans to upgrade the remaining pump station and construct a new pump station and booster station to improve water pressure around the North Hill Reservoir in Des Moines.
- Source and storage capacities are more than adequate for the six-year planning period and the only deficiencies in terms of water supply are associated with pump upgrades at the existing well sites. Pressure zone at the 490-foot elevation has enough storage capacity to meet current demands, including fire flow.
- The District plans an extensive pipeline replacement and capital facility development program to serve the substantial growth that it anticipates within its jurisdiction. Recommended funding program for each element of the District's capital facilities plan is detailed in the 2002 Comprehensive Water System Plan.

Seattle Public Utilities

Seattle Public Utilities (SPU) is the largest purveyor of water in the state. Almost 40% of SPU's available water is purchased by water purveyors. SPU maintains three sources of water supply - the Cedar River watershed, the Tolt River watershed, and three wells in the Highline Well Field - with a total source capacity of 175 mgd. The Cedar and Tolt River watersheds are located in the Cascade Mountains, while the Highline Well Field lies in the area north of the airport. The Highline Well Field recharge area spans an area that includes the northeastern portion of Burien. Water is drawn from the Highline Well Fields only during the summer months when supplies in the other two sources are reduced.

The total direct and indirect service area receiving water directly from the SPU system includes the City of Seattle and portions of unincorporated King County, as well as areas in King and South Snohomish Counties that are served by more than two dozen suburban water districts, municipalities, and nonprofit water associations that purchase water from SPU.

SPU's water distribution system includes 13 open and covered reservoirs, and 39 pumping stations. SWD services the northwest portion of the City of Burien, including the Shorewood area. Within this area, pipe diameters range between 4 and 12 inches, with the majority of the distribution system comprised of the 6 to 8 inch diameter pipes.

Issues:

- To meet the future water demand of the region, SPU's comprehensive plan emphasizes conservation. In addition to demand management efforts, the agency will also pursue improvements in system efficiencies as a way of reducing demand.
- Although efforts will be undertaken to find conservation programs that can be implemented to decrease future demand, eventually new supply facilities will be needed. This is especially true in the latter part of the planning period. Preference will be given to new source options with minimal environmental impacts. New sources include construction of a filtration plant on the Tolt River, that will provide an

estimated increase of 9 to 12 million gallons per day and proposed construction of an inter-tie with Tacoma on their Pipeline No. 5.

4.9.2 Sewer⁸

Burien is served by three separate sewer services providers for the collection and treatment of waste - Southwest Suburban Sewer District, Midway Sewer District and Rainier Vista/Val Vue Sewer District (see Figure 4.9-2). The majority of the city is served by the Southwest Suburban Sewer System. The northeastern portion of the City is served by Rainier Vista/Val Vue Sewer District. A small portion of the southeast area of the City (the 1998 Manhattan-Woodside Annexation) is served by the Midway Sewer District.

Southwest Suburban Sewer District

The Southwest Suburban Sewer District (SWSSD) is the primary sewer service provider within the city. Its service area encompasses two major subareas - the natural drainage basins of Miller Creek and Salmon Creek, with Miller Creek being the larger of the two (see Figure 4.9-3). Agreements between SWSSD and Val Vue Sewer District (VVSD) allow VVSD to discharge wastewater directly into the SWSSD system for treatment.

The SWSSD maintains an extensive system of collector and interceptor sewers to convey wastewater to the Salmon Creek and Miller Creek wastewater treatment plants. Most of the system is comprised of eight-inch diameter pipes, which is standard for residential neighborhoods. In Burien, there are areas of higher densities and intensities, such as schools and the hospital, which are served with trunk and interceptor pipes up to 18, 24 and 30 inches in size.

Based on the most recent infiltration and inflow⁹ (I/I) study the Salmon Creek system is considered in average condition (30% I/I), while the Miller Creek system is considered to be in above average condition (18% I/I). The waste water system within the Salmon Creek service area is generally older than that of the Miller Creek service area.

Both treatment plants provide secondary treatment of wastewater. The Salmon Creek treatment plant facilities have a design capacity of approximately 3.6 million gallons per day (MGD). For the period 1996-2000, annual wastewater flows averaged 3.4 MGD. Peak flow design capacity is approximately 9.1 MGD. High peak flows were experienced during the same time period, and were primarily attributable to high rates of infiltration and inflow during rainy periods.

The Miller Creek treatment plant has a design capacity of 3.9 MGD, with a peak flow capacity of 13.3 MGD. From 1996-2000, annual wastewater flows averaged 3.7 MGD.

⁸ Information Sources: 1) *1993 Comprehensive Sewer Plan Update*, Southwest Suburban Sewer District; and 2) *Comprehensive Sanitary Sewer System Plan, August 1990*, Rainier Vista Sewer District.

⁹ Infiltration refers to groundwater leaking into a pipe through joints, porous walls, or breaks; inflow refers to rainwater entering a sewer system through direct connections, such as roof leaders and catch basins. Together, they can increase the volume of liquids that enter the wastewater system.

The Miller Creek treatment plant also has a compost facility that is able to handle all of the solids from both treatment plants. The composted product is recycled and offered to the community for amending soil.

Issues:

- **Unserved Areas** - There are several areas that are not presently served by sewer collection facilities, including Three Tree Point, Seahurst, parts of Shorewood, and the northeastern and the southeastern parts of the city. Some of these areas are not within the service area boundaries of the districts, while some are within the service area but are not currently sewered.

Poor soils and a high potential for groundwater contamination creates severe limitations for septic tanks in these areas. Most of the unsewered development is in the Miller Creek basin.

There are three aquifers in the area, with the intermediate depth aquifer being the most productive but the most susceptible to contamination. Figure 4.9-4 depicts areas where septic tank failures have occurred between 1979 and 1993, according to the King County Health Department. No records have been kept of the cumulative septic failures in the area since that time.

The extension of sewer collection facilities is planned for unserved areas. The SWSSD has separated these areas into two groups (Figure 4.9-5). First, unserved areas outside the corporate boundaries of the District need to be annexed prior to a utility local improvement district (ULID) formation and sewer construction. Second, there are unserved areas within the District that are pending the formation of ULIDs to finance sewer construction. (The SWSSD will provide sewer facility extensions only when the ULID method has failed and a health risk has been determined.)

Capacity - The SWSSD's most recent comprehensive plan (1999) states that the flow increase anticipated over the next twenty years at the Miller Creek and Salmon Creek plants is within the current design capacities of most existing unit processes (including anticipated and scheduled improvements). However, increasing density and intensity of multifamily and commercial development in Burien could have a negative impact on the capacity of a sewer system designed to serve neighborhoods with lower density uses. In these cases, larger sized pipes may need to replace the smaller diameter pipes with a lower capacity that were established in single family neighborhoods.

Capital Improvements Program

- Upgrade the Salmon Creek and Miller Creek treatment plants with new grit and screen system.
- Construct new outfall at Miller Creek plant.
- Upgrade sludge disposal capabilities and the compost facility.
- Rehabilitation of older deteriorating lines in the Salmon Creek Basin to reduce infiltration and inflow (I/I).

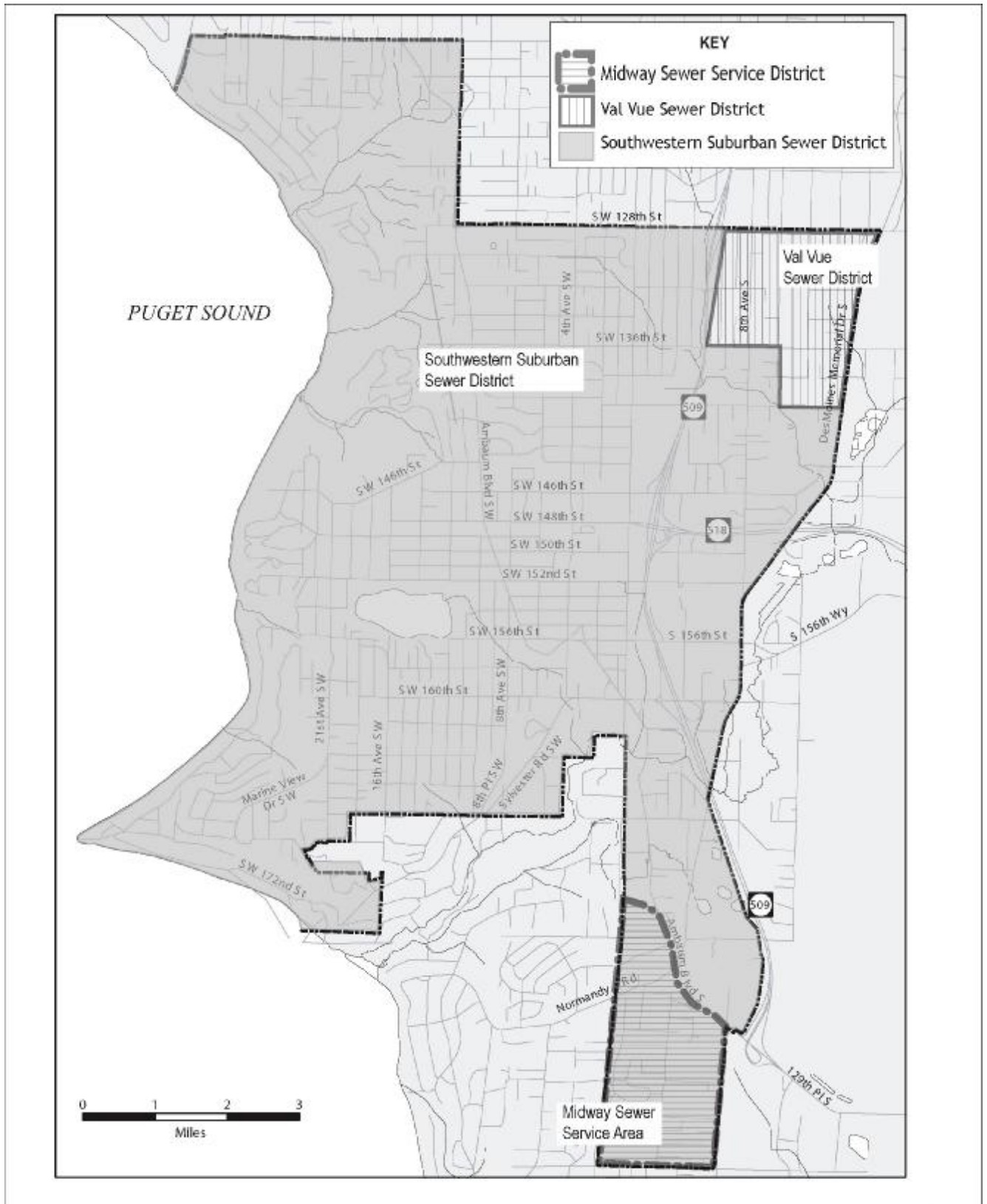


Figure 4.9-2 - Sewer Districts Service Area

November 2003

Source: City of Burien 2003
p11s066.01 Burien_Crit_Comp/Graphics/Figures/FinalPDFs/figure492.pdf

Back of Figure 4.9-2 Sewer District Service Area

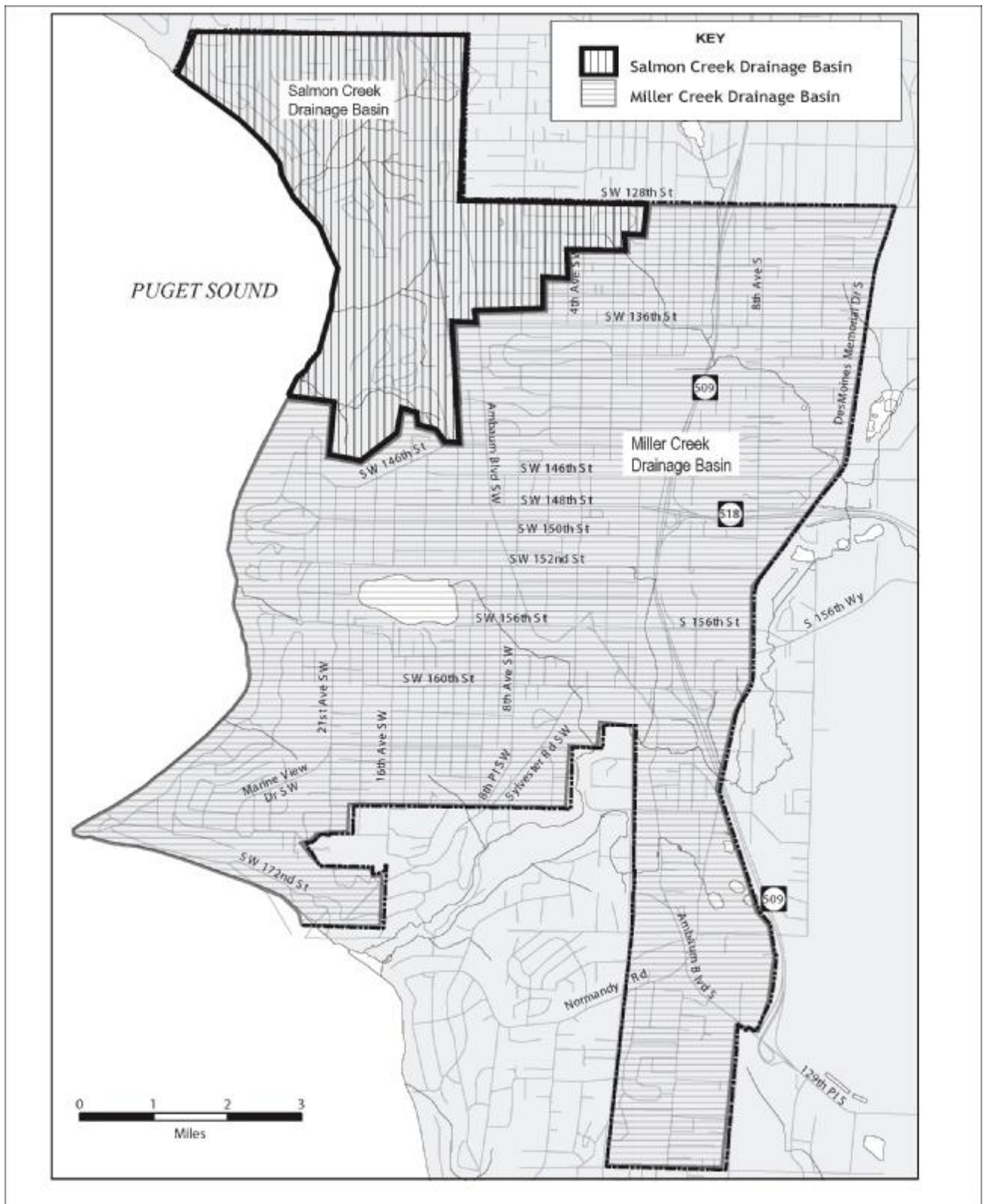


Figure 4.9-3 - Drainage Basins

November 2003

Source: City of Burien Storm Water Drainage Master Plan 2003
 pl fe066.01 Burien Cril_Comp/Graphics/Figures/FinalPDFs/Figure493.pdf

Back of Figure 4.9-3 Drainage Basins

Back of Figure 4.9-4 Unsewered Areas

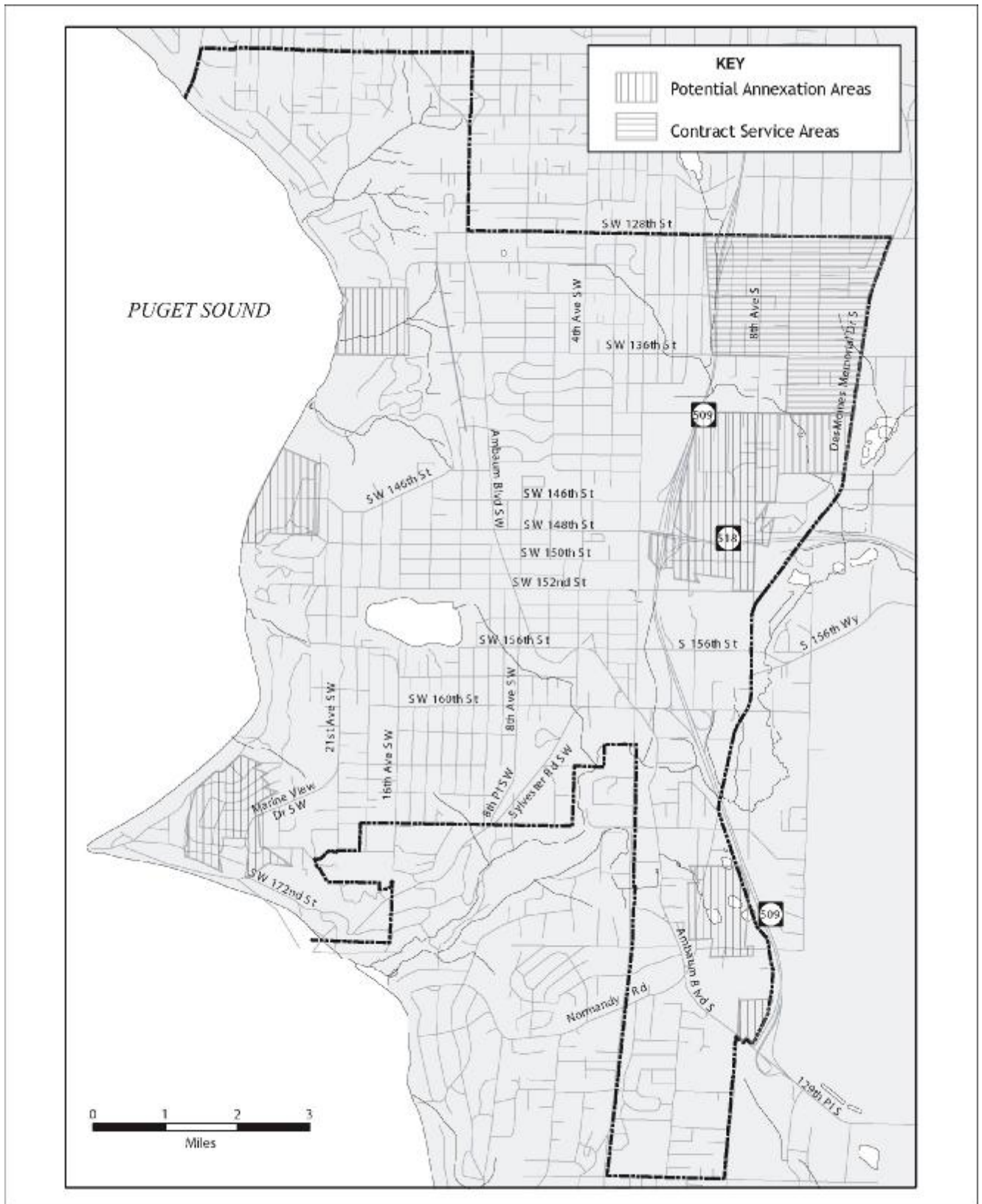


Figure 4.9-5 - Special SW Suburban Sewer Plan Areas

Source: Southwestern Suburban Sewer Plan
p11e066.01: Burtin_Crit_Comp/Graphics/Figures/Final/PDFs/Figure495.pdf

November 2003

Back of Figure 4.9-5 Sewer Plan Areas

- The District will finance collection system improvements in unsewered areas through ULIDs and a Construction Revolving Fund. In sewerred areas, collection and interceptor system improvements will be made using grants, loans, ULIDs, developer financing, and general revenues.

Val Vue Sewer District

The Val Vue Sewer District (VVSD) serves the northeastern part of the city. In November 1995, the Rainier Vista Sewer District (RVSD) merged with the neighboring Val Vue Sewer District (Figure 4.9-6). The combined sewer district now has the responsibility for maintaining RVSD's sewer facilities. The new combined District completed an updated sewer comprehensive plan in 2001.

The VVSD does not operate a sewage treatment facility. Instead, the District's sewage within the City of Burien flows by gravity either to SWSSD's treatment facilities, by way of the Miller Creek interceptor sewer, or to Midway Sewer District's Des Moines Creek Treatment Plant. The VVSD pays treatment rates for these customers to SWSSD and Midway Sewer District.

In general, that portion of the VVSD sewer system in the City of Burien was built in the 1960's and is in fairly good condition. Pipe sizes within the District range from 6 to 24-inches and the District maintains 19 pump stations to compensate for the hilly terrain within the service area. Major improvements planned for the next ten years focus on extending sewers into currently unsewered areas.

Issues:

- **Unsewered Areas** - Similar to the unsewered portions of the SWSSD, the portion of the VVSD area which is presently unsewered has a history of on-site septic system problems due to the terrain, soils and high groundwater (see Figure 4.9-4). Consequently, these characteristics have tended to limit the density of development in the service area. Several neighborhoods that are most in need of sewer systems in the northeast portion of the city have not historically been financially able to finance sewer extension. However, a 10 inch sewer line was extended into this area (Des Moines Way South & South 132nd Street) in 2001 and the Cedarhurst Elementary School area was connected to sanitary sewer. The District anticipates that redevelopment spurred by expansion of Sea-Tac International Airport and the Third Runway may make sewers more cost efficient for these areas. The District's capital improvement program anticipates the need to extend sewers in the area of South 128th Street to 144th Street and the 12th Avenue South and South 138th Street neighborhood within the next ten years as requested by development.

Capacity - The majority of pipe in the District is approximately 8 inches in diameter. In general, current flows are below the estimated capacity in this area. To determine future capacity, the *2000 Comprehensive Sewer Plan* for this area used a model that estimated flows based on a build-out of current zoning that may or may not be achieved. If the northeastern portion of the city were built out to its maximum allowable zoning, and with

the addition of an estimated amount of I/I, the existing interceptor pipe and collection system is expected to accommodate projected flows.

Capital Improvements Program

- Any significant expansions of the District's present system will be limited to the development of new sewers within unsewered portions of the service area.
- New sewers from S. 128th Street to S. 144th Street (between 6th Avenue S. and 10th Avenue S.) and along 12th Avenue S. and S. 138th (from S. 129th Street to S. 140th Street) are proposed to be constructed during the next ten years based on request from development or by utility local improvement district (ULID) formation. The District will provide sewer facility extensions into unsewered areas only when the ULID method has failed and a health risk has been determined by King County.

The \$17.5 million capital improvements program for the years 2001-2010 will be financed primarily by developer extensions and/or ULID's (Utility Local Improvement Districts). Connection charges, fund balance, and rates account for the remaining financing sources. Public Works Trust Fund loans may be used to supplement the District's funds.

Midway Sewer District

The Midway Sewer District (MSD) provides sanitary sewer service to the extreme southeastern corner of the city (Manhattan annexation area). Its City service area is located within the Des Moines Creek Drainage Basin. The MSD maintains 13 pump stations and an extensive system of collector and interceptor sewers to convey wastewater to the Des Moines Creek Wastewater Treatment Plant. Most of the system is comprised of eight-inch diameter pipes, which is standard for residential neighborhoods. In Burien, the area within the MSD's boundary includes the area north of S. 192nd Street between 4th Avenue S. and 8th Avenue S.

The Des Moines Creek treatment plant provides secondary wastewater treatment. It has a design capacity rating of 6.0 MGD and was recently upgraded to 9 MGD capacity. It currently operates within its upgraded design capacity and is expected to accommodate the projected wastewater demand within the District for at least the next six years.

Issues:

- **Unserved Areas** - There are several small subdivisions within the Manhattan area of the City that are within MSD boundaries but not presently served by sewer collection facilities, including the area between 4th Avenue S and 8th Avenue S. from S. 192nd Street to S. 186th Street. There are no specific known problems at the present time caused by septic tanks in this area. However, it is generally inconsistent with the goals of providing urban levels of service within urban growth areas. Further development in the area may be impeded by the lack of sewers.

The extension of sewer collection facilities is proposed for unserved areas within the MSD, including Manhattan. As on-site septic systems fail over time, or

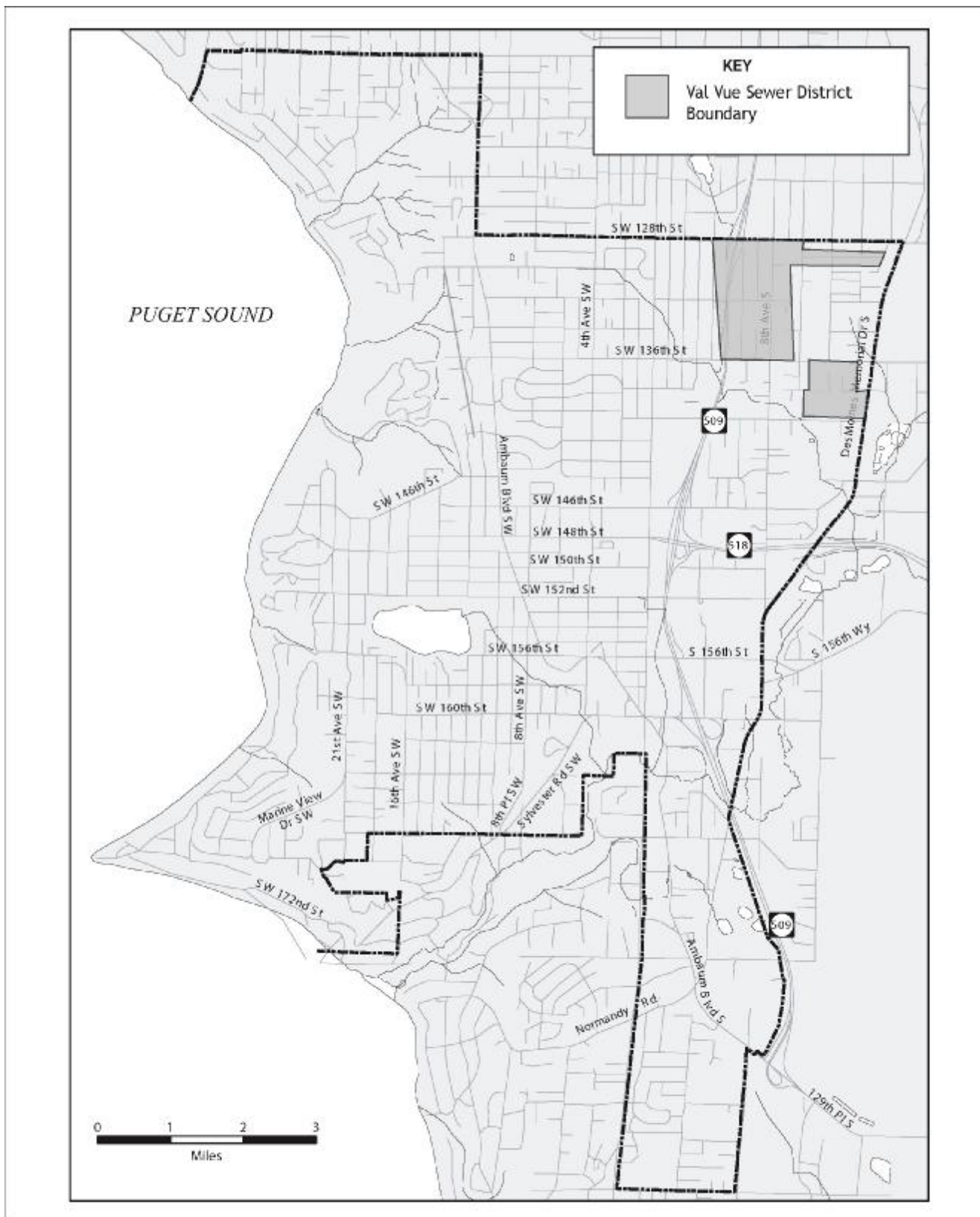


Figure 4.9-6 - Val Vue Sewer District and Service Area

November 2003

Source: Val Vue Generalized Plan
p11e066.01: Burtin_Crit_Comp/Graphics/Figures/FinalPDFs/Figure496.pdf

Back of Figure 4.9-6 Val Vue Sewer District

as required by development or redevelopment, sewer service is expected to eventually be provided to these areas. The District utilizes utility local improvement district (ULID) formation and developer extensions as the primary means to extend sewers into unsewered areas. The District will provide sewer facility extensions into unsewered areas only when the ULID method has failed and a health risk has been determined by King County.

Capital Facilities Plan

- Upgrade the Des Moines Creek treatment plant with two new clarifiers and improved headworks and sludge filters.
- Provide improved or new 2000 lineal foot marine outfall into Puget Sound
- Upgrades for pump stations, including repairs, rehabilitation, and new generators.
- The District will finance collection system improvements in unsewered areas through ULIDs and a Construction Revolving Fund. In sewer areas, collection and interceptor
- system improvements will be made using grants, loans, ULIDs, developer financing, and general revenues.

4.9.3 Stormwater Drainage

The City is in the process of adopting an updated Storm Water Master Plan that will be adopted as an element of the overall Comprehensive Plan. This section provides a brief summary of the existing conditions and issues surrounding storm water drainage in the City. A more complete description of the drainage problems and proposed projects planned by the City to remedy those problems are identified in the Storm Water Master Plan and the Capital Improvement Program (CIP). The Storm Water Master Plan (SWMP) emphasizes the movement toward Low Impact Development (LID) standards that focus on maximizing infiltration of rainwater to mitigate storm water flows and associated erosion and water quality impacts. The SWMP will seek to utilize best management practices for storm water runoff from land development to achieve higher infiltration rates (where practical and feasible) rather than rely on additional (and more costly) storm drainage conveyance and detention facilities.

The City of Burien is covered almost entirely of three major drainage basins: Salmon Creek, Miller Creek and Puget Sound. All of the drainages flow into Puget Sound.

The Salmon Creek drainage basin encompasses more than 2 square miles, most of which lies outside the city to the north. In Burien, the Salmon Creek Basin is comprised mainly of steep wooded ravines west of Ambaum Boulevard SW. Salmon Creek does not become an open stream until it crosses Ambaum Boulevard SW. A 24-inch diameter concrete pipeline (called the Old Government Line) functions as a partial drainage bypass for Salmon Creek. The pipeline, which runs along the south side of the creek, originally discharged into Puget Sound. Over time, however, sediment has plugged the outfall and the pipeline currently discharges at the beach by bubbling up through a damaged manhole. Land within the basin is almost fully developed as residential and commercial property. In the past, Salmon Creek has seen salmonid spawning activity, however, it currently has relatively poor fish habitat due to low flows in the summer months.

Undetained runoff in some areas and lack of runoff treatment have contributed to bank erosion and polluted runoff within the basin.

The Puget Sound Basin originates along the steep bluffs bordering Puget Sound, including portions of Shorewood, Seahurst and Three Tree Point. Most of the land within the basin is developed for residential purposes. There are no significant detention or water quality facilities in the basin. Erosion along the steep hillsides from development and impervious surfaces are the primary drainage concern in the basin currently.

The Miller Creek Basin covers an area greater than 11 square miles—fully half of it within the City of Burien. Miller Creek falls more than 400 feet from its source in the City of Sea-Tac to its Puget Sound outfall in the City of Normandy Park. Land within the basin is almost fully developed by a mix of residential and commercial uses. Lack of runoff treatment from development prior to 1980 has resulted in polluted runoff and high peak flows which has led to erosion problems and poor water quality in Miller Creek (especially in the lower reaches). Miller Creek has relatively poor fish habitat due to sedimentation and low flows in the summer

months. Localized flooding problems have been identified in the upper reaches of the stream basin associated with isolated low wetland areas (e.g., Hermes, Mayfair and 142nd Street).

4.9.4 Electrical System

The transmission of electricity to Burien is delivered by both Seattle City Light and Puget Sound Energy and regulated by the Washington Utilities and Transportation Commission. The service areas for these two districts is depicted in Figure 4.9-7.

Seattle City Light

Seattle City Light (SCL) is the City of Seattle-owned electric utility serving approximately 131 square miles, including the majority of the City of Burien.

SCL owns and maintains approximately 649 miles of transmission lines which carry power from the Skagit and Cedar Falls generating facilities to 14 principal substations. Power is distributed from these principal substations via high voltage feeder lines to numerous smaller distribution stations and pole transformers which reduce voltage to required levels for customers. The capability of SCL's transmission and distribution system to serve the demands of its customers is limited by the capacity of the distribution substations. Burien is served by the Duwamish substation which currently has sufficient capacity. However, the feeder lines serving the City are slightly under capacity, and SCL will be reconfiguring these systems over the next fifteen years.

Within the city, SCL owns property located north of the Kennedy High School and west of SR 509. This property is reserved as a future substation site.

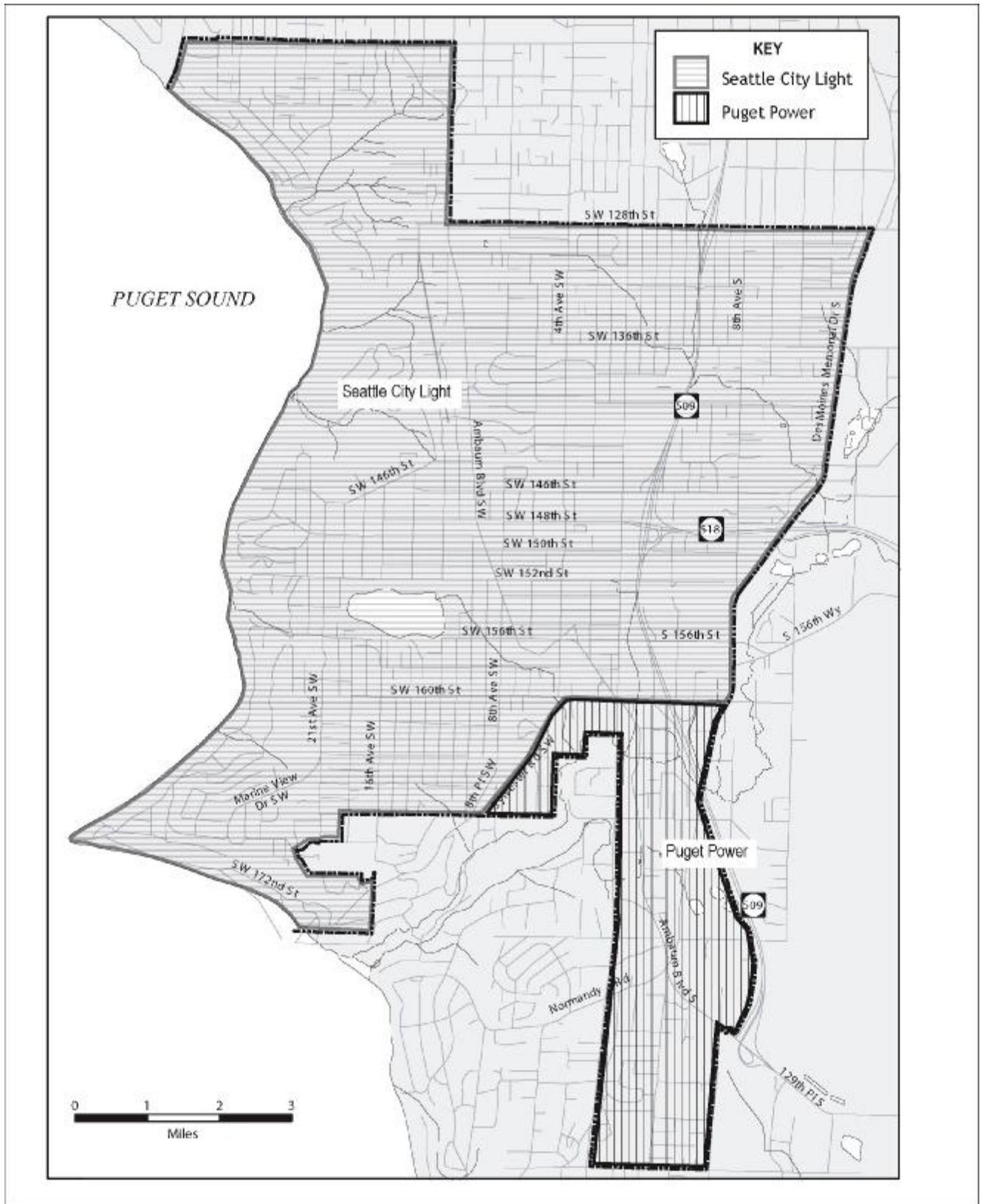


Figure 4.9-7 - Power Districts in Burien

November 2003

Source: Seattle City Light 2003, Puget Power 2003
 p11e066.01 Burien_Crit_Comp/Graphics/Figures/Final/PDFs/Figure497.pdf

Back of Figure 4.9-7 Power Districts

Puget Sound Energy (PSE)

As can be seen in Figure 4.9-7, PSE supplies electrical service to a small portion of Burien located in the southeast corner of the city.

PSE purchases distribution and/or transmission services from BPA. Power is supplied to local areas through high voltage transmission lines that are connected in substations to a series of transformers. These transformers initially reduce the voltage levels from 500kV to 230kV. The 230kV lines feed smaller substations that transform power down to 115kV and lower. This enables the utility to serve neighborhoods more cost efficiently and ensure that there is adequate thermal capacity for the neighborhood loads being served.

Burien is part of the Highline/Green River subarea of the King County Electrical Facilities Plan, approximately 86 square miles in size. The subarea includes the cities of Renton, Kent, Des Moines, and SeaTac, as well as Vashon Island.

Issue:

- As the subarea develops and customers demand more power with higher reliability, there will be a need for more higher voltage transmission lines, transformers, and distribution stations. In recognition of this, the *Draft Electrical Facilities Plan for King County*, prepared by PSE, January 1993, identifies a number of improvements in the Highline/Green River Subarea. None of these improvements is located within the City of Burien.

4.9.5 Solid Waste

The City of Burien and King County have adopted the 1992 Comprehensive Solid Waste Management Plan which includes a 65% waste stream reduction goal. In order to help meet this goal, the King County Solid Waste Division has established the Waste Reduction/Recycling Grant Program. The program funds projects to reduce and recycle the waste generated by commercial enterprises, individuals living in multi-family residential dwellings in King County's suburban cities, and yard waste generated by residential and commercial properties. The City of Burien is utilizing its grant funds to develop a waste reduction and recycling plan. After developing the plan, the city will use grant funds to implement projects outlined in the plan.

Residents of the City of Burien are served by three garbage/recycling companies: Nick Raffo Garbage Company, Rabanco/SeaTac Disposal, and Recycle America/Waste Management of Seattle. Each of the three haulers is operating under a franchise agreement through the Washington Utilities and Transportation Commission. The franchises were established prior to the City's incorporation and remain in effect.

Burien's three haulers provide recycling services for residential customers. Multi-family, and non-residential customers may be provided recycling if requested. The types of materials collected through the programs include aluminum cans, tin cans, glass bottles, plastic bottles, newspaper, cardboard, and mixed paper. Additionally, the haulers offer yard waste collection services.

The City of Burien has established a special program to collect hazardous materials and other items that are recyclable but not collected through regular curbside service. The city collects such items through Special Recycling Collection Events, which are held in the spring and fall. Through these events, the city collects motor oil and filters, automotive tires, lead acid batteries, appliances, scrap metal, bulky yard debris, scrap wood, textiles, and reusable household goods. The city held its first Special Collection Program in September of 1995 and it was very well received by the community. Subsequent recycling events have also been well received.

In addition to the above-mentioned recycling services, other recycling opportunities are available to Burien residents. There are a number of recycling drop-off and buy-back centers in the area, as well as the privately owned and operated Burien Recycling Center. The Recycling Center accepts a wide variety of materials not collected through regular curbside programs, such as batteries, books, magazines, and an assortment of plastics and metals.

4.9.6 Natural Gas

Puget Sound Energy (PSE) is an investor owned energy utility serving more than 480,000 customers in King, Snohomish, Pierce, Thurston and Lewis counties. PSE also provides natural gas services to the City of Burien.

PSE is not an essential service, and therefore, is not mandated to serve. Extension of service is based on request and the results of a market analysis to determine if revenues from an extension will offset the cost of construction.

Transmission System

Natural gas is supplied to the entire Puget Sound region from the Northwest Pipeline. Its system within the state of Washington is primarily two large pipelines, 26 and 30 inches in diameter.

Natural gas can be stored in two ways. First, it can be pressurized and then injected into large underground aquifers which are suitable for gas storage. This is done locally at Jackson Prairie Gas Storage Field located south of Chehalis. This gas is used to supplement the region's gas supply in colder weather. Natural gas can also be stored by cooling it to -258 degrees Fahrenheit. At this temperature, it becomes a very dense liquid and can be stored in storage tanks. This type of storage facility is located in Plymouth, Washington.

Natural Gas Supply System

Natural gas is supplied to the City of Burien through gate stations along the Northwest Pipeline. A gate station is the delivery point of natural gas from the high pressure Northwest Pipeline to PSE's more localized system network. Gate stations usually include metering stations and pressure regulators. Pressure regulators reduce the pressures to approximately 200 to 300 psi. At the gate station, the natural gas is metered

and becomes the responsibility of PSE. Burien is served by the South Seattle Gate Station where gas from the pipeline is reduced to 250 psi. Capacity at this station is about 6 million cubic feet per hour.

PSE's supply mains transport gas to district regulators throughout their service area in Burien. These supply mains may vary in size from 4 inches to 16 inches. The pipe material is typically steel wrap. District regulators are pressure regulating stations that furnish gas to the intermediated pressure distribution system. Pressures in the IP systems normally range from 25 to 60 psi. Distribution main sizes vary from 1-1/4 inch to 8 inches in diameter. Individual residential service lines are typically 5/8 inches to 2 inches in diameter.

Future Construction

PSE has an active policy of expanding its supply system to serve additional natural gas customers. PSE's engineering department continually performs load studies to determine optimum capacity to serve its customers. The maximum capacity of the existing distribution system can be increased as required by one or more of the following:

- 1) Increasing distribution and supply pressures in existing lines.
- 2) Adding new distribution and supply mains for reinforcement.
- 3) Increasing existing distribution system capacity by replacement with larger sized mains.
- 4) Adding district regulators from supply mains to provide additional intermediate pressure gas sources to meet the needs of new development.

4.9.7 Telecommunication Services

Qwest Communications

Qwest delivers telecommunication service for the city, as regulated by the Washington Utilities and Transportation Commission.

There are hundreds of central offices (COs) serving Qwest customers in Washington. A CO is the facility where calls are switched. The City of Burien is served by the Cherry CO, located at S.146th Street and 8th Avenue South in Burien.

Local and Future Capacity

Qwest does not provide estimates of local capacity due to the proprietary nature of this information. WUTC regulations require Qwest to provide adequate telecommunications service on demand, and Section 480-120-086 of the Washington Administrative Code requires telecommunications providers to maintain adequate personnel and equipment to handle any reasonable demand and traffic. Because Qwest provides service on demand, there are no envisioned limits to future capacity.

Other Communications

Cable Television is provided by Comcast. Cellular telephone service is provided by several carriers.

4.10 SCHOOLS

The following sections describe the public and private schools located within the City of Burien that service the Burien vicinity.

4.10.1 Private

There are four private schools operating within the City of Burien. These include the John F. Kennedy Memorial High School, Saint Francis of Assisi Church School, the Montessori-Normandy Park Academy, and the Burien Adventist School.

4.10.2 Public

The Highline School District services the City of Burien student population. Six elementary schools, one middle school, one high school and one alternative high school are located within the City. The capacity of schools in the Highline School District and enrollment for the year 2003 are summarized in Table 4.10-1. According to the School District, the average classroom size is approximately 22 to 24 students. The average district classroom size of 22 students was multiplied by the number of teaching classrooms available at schools to determine the estimated student capacity of each school. Using this approach, Table 4.10-1 indicates that the estimated student capacities of the elementary and middle schools in the district are sufficient to meet the current enrollments. Highline High School is currently operating at capacity. SeaTac Occupational Skills Center, an alternative high school, currently has more students attending than it has classrooms, although capacity is measured somewhat differently for this type of school. Figure 4.10-1 depicts the locations of District schools that serve the Burien community.

Based on the District's overall forecast, student enrollment is projected to decrease slightly by approximately 60 students district-wide through the 2003-2004 school year. This represents a 1% decrease in the District's current student population and would not affect planned capacity of the school district. Student population is anticipated to be relatively stable district-wide, with anticipated increases projected for the White Center and the Highway 99 corridor areas. The District's assumptions for student population growth include: 1) new single and multifamily housing development will take place at the current rate; 2) there will be no unexpected, major land use changes in the Highline School District; 3) the residential in/out-migration patterns of students will remain relatively constant; 4) no dramatic changes in present ratios of private to public school enrollments will occur; and 5) existing and foreseeable educational programs will approximate those currently operating within the District.

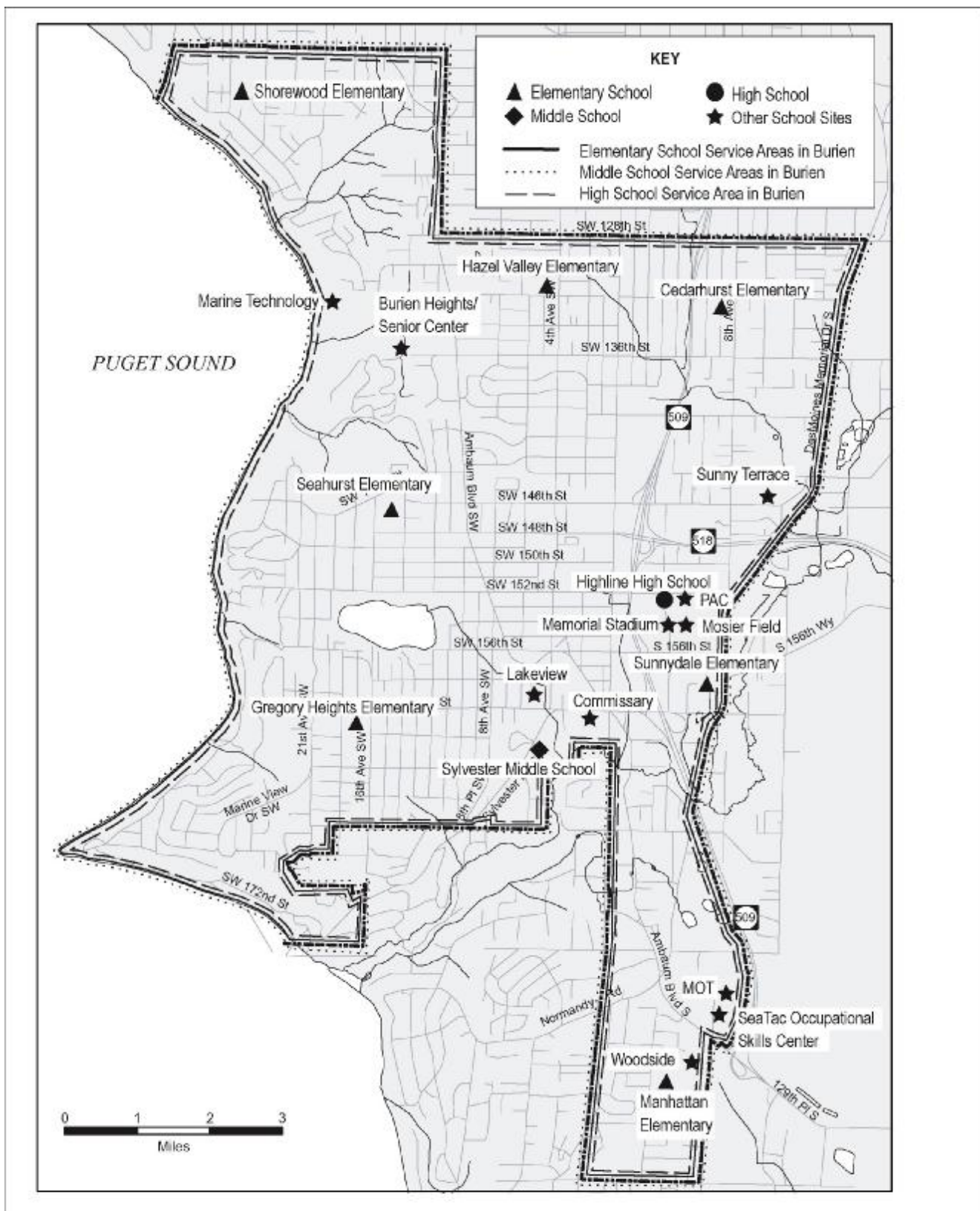


Figure 4.10-1 - School Locations in the Highline Service Area November 2003

Source: Highline School District 2003
p11e066.01: Burien_Crit_Comp/Graphics/Figures/Final/PDFs/Figure4101.pdf

Back of Figure 4.10-1 School Locations within the City of Burien

Table 4.10-1 Highline School District Student Capacity and Enrollment, 2003

HIGHLINE SCHOOL DISTRICT	Regular Capacity	Special Capacity	Portable Capacity	Total Capacity	2003 Student Enrollment	Enrollment as Percent of Capacity
Elementary Schools						
Cedarhurst	418	0	0	418	330	79%
Gregory Heights	462	22	44	528	401	76%
Hazel Valley	330	44	88	462	362	78%
Seahurst	594	0	0	594	583	98%
Shorewood	440	0	22	462	360	78%
Sunnydale	572	0	0	572	485	85%
Subtotal	2,816	66	154	3,036	2,521	83%
Middle School						
Sylvester	814	22	88	924	737	80%
High Schools						
Highline HS	1,496	22	0	1,518	1,529	101%
SeaTac Occupational Skills Center	308	0	0	308	393	128%
Subtotal	1,804	22	0	1,826	1,922	105%
TOTAL	5,434	110	242	5,786	5,180	90%

Note: Capacity based on average of 22 students per classroom

Source: Highline School District 2003.

Capital Improvements

The District's 10 Year Capital Facilities Improvement Plan (CIP) contains a plan for financing improvements for the years 2002 through 2011. According to the CIP, one of the biggest issues for the school district is the condition of the buildings. Most of the schools are more than 40 years old and were never designed to last more than 20 years.

To address this issue, several major improvements are scheduled for area schools. Both Hazel Valley and Gregory Heights elementary schools are scheduled for replacement by the year 2004. These short-term improvements reflect increased capacity for the 2004-2005 school year for these elementary schools, as indicated in Table 4.10-2.

Shorewood elementary school is scheduled for replacement by 2006. Future student capacity in these schools will be increased to add classrooms to provide for approximately 600 students. Based on enrollment projections, District Standards of Service, current inventory and capacity, and future planned classroom space, the District will have sufficient capacity to house students over the next six years.

The CIP also identifies a number of school remodelings that are anticipated to take place between 2002 and 2009. Cedarhurst elementary school is scheduled to be replaced to increase capacity to 600 students by the year 2006. Sunnydale elementary school is scheduled to be renovated to serve as an interim school. Remodels are scheduled to increase capacity to 1,500 at Highline High School by the year 2009 and to 750 at

Table 4.10-2 Capacity Improvements for 2004-2005 School Year

HIGHLINE SCHOOL DISTRICT	Total Classroom Capacity 2003	Total Student Capacity 2003	Added Classroom Capacity	Total Classroom Capacity 2004	Estimated Student Capacity 2004
Elementary Schools					
Gregory Heights	24	528	2	26	572
Hazel Valley	21	462	5	26	572
Subtotal	45	990	7	52	1,144

Note: Estimated student capacity based on average of 22 students per classroom

Source: Highline School District 2003.

Sylvester Middle School by the year 2009. The financing components of the CIP for these improvements include secured and unsecured funding options. The CIP is based on the passage of future bond issues, receiving funds from the FAA, POS, and State of Washington, and securing matching construction funds.

4.11 PARKS

Overview

The City of Burien contains 14 parks ranging in size from a small memorial parcel to a 150-acre regional park (not including parklands associated with school district properties). In many cases, these facilities were transferred to the City from King County after incorporation in 1993. Over 300 acres of park, recreation, and open space lands are currently available for use by Burien residents (Figure 4.11-1).

The Highline School District owns not only active schools but also “retired” school facilities that may now be leased and operated by other agencies. In some cases these other agencies (such as the senior center) provide recreational services to their clientele. All of the active school facilities provide park type functions and recreational services to their neighborhoods (in the case of the elementary schools) and to the general community (in the case of secondary schools). This report treats retired school facilities that provide park services as “private” facilities unless they are leased by either the city or the county as public “parks” (as in the case of the Lakeview School Park).

Private park facilities are also available to Burien residents. These facilities include a variety of types, ranging from commonly owned open space areas to intensively developed private recreational “fitness” centers.¹⁰

In 2000, the City completed the City of Burien Parks, Recreation and Open Space Plan (Parks Plan), adopted by reference in this Comprehensive Plan. The Parks Plan is intended to be used to implement the Parks Element of the Comprehensive Plan. The Parks Plan provides detailed information on park facilities and categories, inventories of existing parks and projected demands and needs not provided in the Comprehensive Plan.

¹⁰ In addition to the inventoried facilities there are numerous small facilities in regular commercial structures such as dance studios, karate schools, etc.

The Parks Plan also provides the findings of a parks survey conducted by the City and the results of a demand/need assessment which form the basis for the LOS goals outlined in the following section. For a more detailed discussion of Burien's park and open space conditions, please refer to the Parks Plan on file with the City.

Existing Facilities and Standards

Figure 4.11-1 identifies the existing public park, recreation, and designated open space facilities within the City. As mentioned above, a detailed inventory and classification of existing parks, open space, and recreation facilities is contained in the Parks Plan. An inventory of the park and recreation resources for the City of Burien identified in the figure is also shown in Table 4.11-1. As noted above, school facilities provide park type functions and recreational services; therefore, the estimated area of school facilities available for park use is included in the inventory of park and recreation resources. Additionally, parcels that have been purchased by the City for future park use were also included in the inventory.

LOS standards for park facilities are one recognized method of expressing the quantity of recreation service provided for a given amount of demand. It is simply a ratio of quantity versus demand (usually measured in numbers of people). It is commonly expressed as a number of acres or miles of facilities per a given population such as two acres of neighborhood park per every 1,000 people or 0.5 miles of trail per 1,000 people. The National Park and Recreation Association (NRPA) standards are examples of national LOS recreation standards. The City of Burien developed a LOS goal for each type of park and recreation resources was by comparing the existing condition in the City with the average existing condition in four adjacent communities (Des Moines, SeaTac, Normandy Park, and Tukwila). These comparisons, along with a complete LOS analysis, are provided in the Parks Plan. Table 4.11-2 presents LOS goals for the following types of park and recreation resources as presented in the Parks Plan: Neighborhood Parks/Playgrounds; Community Parks; and Open Space.

LOS goals for other types of park and recreation resources were not provided in the Parks Plan because they tend to be dependent on location and environmental conditions of the site.

Table 4.11-1. City of Burien Parks Facilities Inventory

Facility Type	Facility Name	Existing Size
Neighborhood Parks/Playgrounds	1. Chelsea Park	3.7
	2. Manhattan Area Park	1.5
	3. Lakeview Park	3.3
	4. Lake Burien School Park	4.6
	5. Shorewood Park	3.4
	subtotal	16.5
Community Parks	6. Moshier Park	15.2
	7. Dottie Harper Park & Burien Community Center	8.8
	8. Senior Center	3.5
	subtotal	27.5
Undeveloped Parkland ³	9. Mathison Property Park	5.7
	10. North Ambaum Area Park	1.0
	11. Eagle Landing Park	6.3
	subtotal	13.0
Regional Parks/Open Space	12. Seahurst Park	158.8
	13. Salmon Creek Ravine and Waterway	87.6
	subtotal	246.4
Other	14. Des Moines Memorial Park	.02
Trails	Indian Trail	n/a ¹
Schools ²	Highline High School	6.5
	Sylvester Middle School	6.3
	Gregory Heights Elementary	5.0
	Sunnydale Elementary	5.5
	Shorewood Elementary	4.5
	Hazel Valley Elementary	5.8
	Cedarhurst Elementary	3.5
	Seahurst Elementary	2.8
	subtotal	39.9
TOTAL PARK ACREAGE		303.4

1. Indian Trail is 1.0 mile long.

2. Existing size given for schools is the school area available for park use estimated from aerial photos.

3. Undeveloped parkland includes land acquired by the City that is intended for park, recreation, and/or open space development.

Source: City of Burien Parks Department 2003.

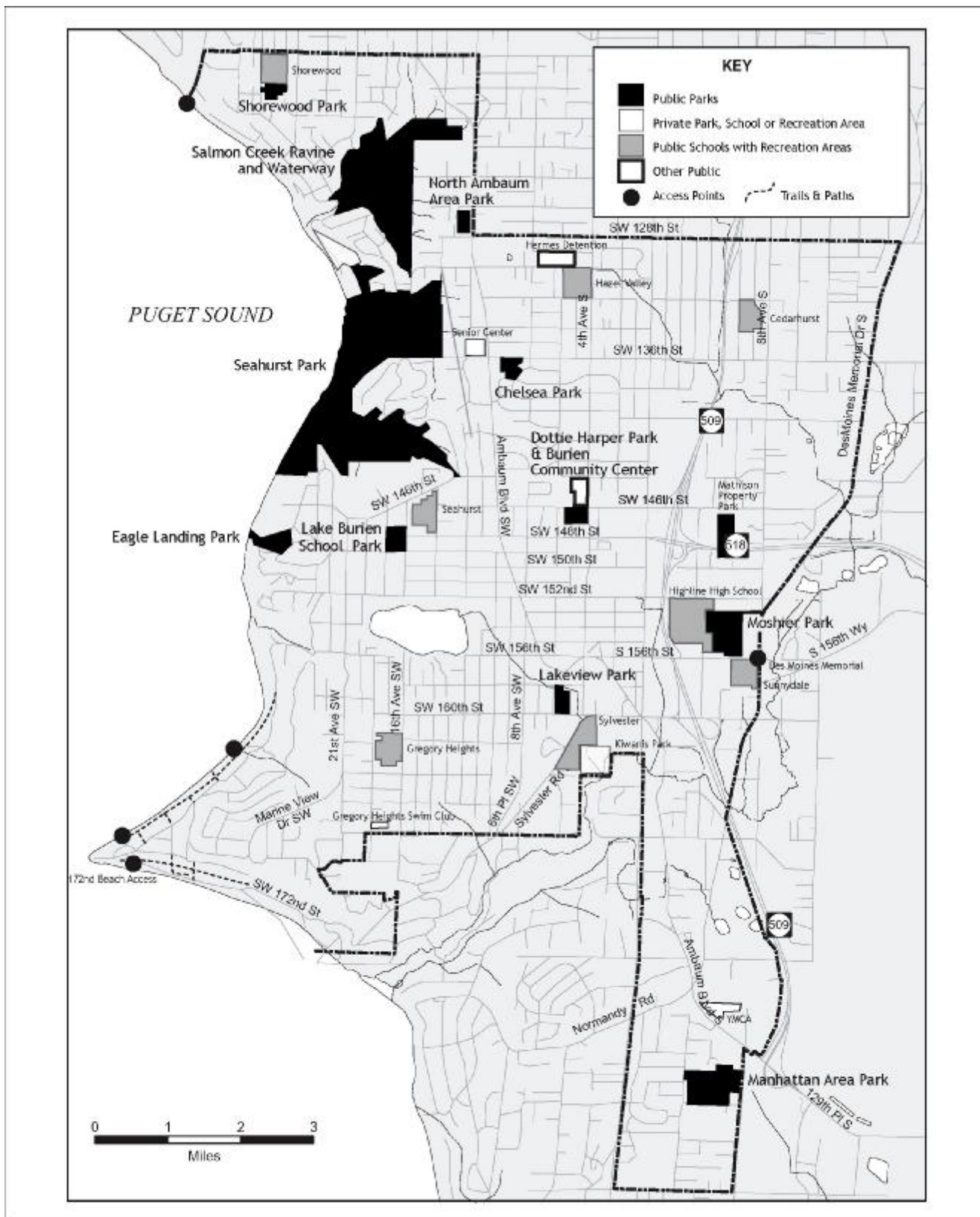


Figure 4.11-1 - Parks and Recreation Areas

Source: City of Burien 2003
p11ec06.01: Burien_Crit_Comp/Graphics/Figures/FinalPDFs/Figure4111.pdf

November 2003

Back of Figure 4.11-1 of park facilities

Table 4.11-2 City of Burien Parks LOS Goals

Facility Type	Burien LOS Goal	Existing Inventory (acres)	Demand ¹ (acres)	Need (acres)
Neighborhood Park/Playground	2 acres / 1,000 pop.	15.0	63.8	52.2
Community Park	2.5 acres / 1,000 pop.	23.3	79.7	56.5
Open Space	4 acres / 1,000 pop.	76.8 ²	127.5	47.3

1. Demand based on 2000 population of 31,880 provided in the *2003 Demographics Report* prepared by the City,

2. Seahurst Park is not included in the open space inventory as it is developed as a regional park.

